CHEMICAL MARKETS

VOLUME XXXIII NUMBER 1

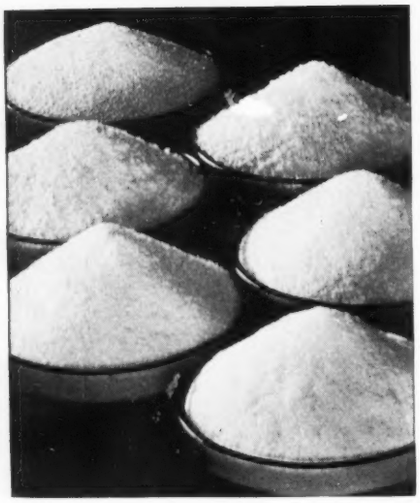
Control of Industry

GENERAL JOHNSON has initiated the administration of the Industry Recovery Law auspiciously in simplifying his vast problem by selecting one goal and working towards it through a selected group of large industries. This display of common sense is reassuring. He is concentrating on the task of spreading employment and increasing buying power, and the worth of this objective cannot be questioned.

He has put the control of competition up to business; he has associated with his administration a number of capable, practical industrialists; he has promised not to encourage the unionization of all labor while at the same time discouraging the raising of prices. In a word, he is trying to let business do its own house-cleaning, and wants it to keep its own house in order.

So far, so good; but all this is a very short step towards the extreme lengths to which this extraordinary law goes. It certainly authorizes a Leninian control of industry backed with ample powers. Contrariwise, it provides for the virtual annulment of the anti-trust laws. The two are incompatible, but it is pretty plain in which direction the present administration is steering, and we have plenty of reason to be suspicious of the principle of legal control over economic forces and of the bureaucratic practice of that control.

Small wonder that this bold experiment injects tremendous uncertainties into the present business situation. In fact, the only certainty is that our Government under Mr. Roosevelt will continue to make dramatic economic experiments. However disquieting this may be alike to those who distrust human capacity to control economic forces and those who have learned how dangerous it is to vary more than a single factor in any experiment, nevertheless, we must recognize that the old "automatic" controls of supply and demand have been so checked by regulated gold, by tariffs and taxes, by price pegging, by cartels and combinations, by labor unions, that our industrial machine no longer can strike the balance between production and consumption. *Laissez-faire* ceases to be practical because supply and demand no longer function freely. We are forced—however little we may like it—to build new machinery for co-ordinating economic activity.



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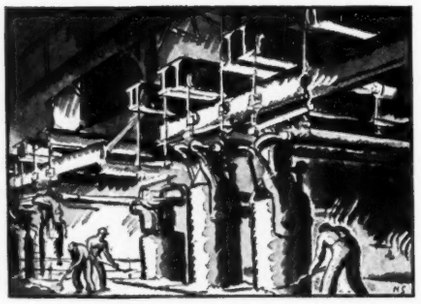

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SWANN RESEARCH — TO FIND A BETTER WAY

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Decoding the Codes Just about 3,796 chemical meetings will be held during this hot month of July, and about three million of good man-hours will be devoted to discussing *the* code. Most of this will be a woeful waste of time, since any man reasonably familiar with the practices of any trade group and fairly deft in the use of the English language can write a perfectly good code in about one hour.

It is not the code that counts anyway; but the machinery an industry sets up to discover infringements of the code, to investigate them when discovered, and to punish them if guilty. That is what is really important. This is a task beside which code-writing is child's play.

A Real New Deal Following the current political fashion CHEMICAL MARKETS, beginning with this issue, introduces a "New Deal" for our readers.

In the logical sequence of their appearance:

A Plant Management Section—where plant executives, operating officials, chemists, and engineers will find feature articles and news of particular importance to them grouped together and therefore more easily accessible—a distinct saving of time in a period when that elusive element in manufacture never was more important.

A Section of Abstracts—an entirely new feature in which the articles of the past month, most important for the busy executive, are briefly summarized.

The "Prices" (current quotations) have been rearranged so that each page contains but one column rather than two columns of text. Items will be more easily and quickly found in this style of "makeup".

The "Market Comment" has been moved to "Chemical Facts and Figures" (news department), and only the very salient features and developments of the month concisely summarized under the various news section heads, viz: Heavy Chemicals, Fine Chemicals, Naval Stores, etc. Next to the U. S. Senate, market reporters can "write" more and say less than any group, and market comment of the type: "a broader demand with the improvement of a seasonal nature but no change in the quotations" is a waste of words, but of greater importance—a sinful waste of the reader's time.

CHEMICAL MARKETS is constantly striving to be brief, specific, correct. In the new deal we pledge even greater considerations of your time without sacrificing accuracy or completeness.

Cartel and Trade Association Dr. Lewis Marks has pointed out that there is a startling parallelism between the German cartel law and the powers granted to American trade associations under the new Industry Recovery Act. The German law requires that the cartel agreement shall be in writing, and provides for its legal enforcement upon recalcitrant members up to that point where the Cartel Court finds the activities are not contrary to the public interest. Our officially approved codes with power to curtail production and fix prices, but with dire penalties for monopolistic control, have certainly superficial differences but a great fundamental similarity. As the German law was passed in the time of great economic stress and with the avowed object of strengthening German industries by enabling them to check surplus capacity and ruinous competition, the basic unity of these two laws is obvious.

This opportunity to control overproduction and put a stop to ruthless price cutting is the incentive held forth to our industries to enter into partnership with Government, as the phrase goes, and it is therefore distinctly disconcerting to discover that the cartel program officially sponsored in Germany has failed rather dismally. There is no conspicuous success except the Potash Syndicate which is essentially a natural monopoly under almost direct Government control, and German industries have proceeded with the rationalization plan upon the familiar basis of corporate control. Against this economic background the political battle of Nazi vs Socialist has been fought.

If the similar law here develops a similar situation both Judge Emery and Senator Borah will be able to cry, "I told you so!" That would be a most astonishing development surely; but it fades away before the prospect of the Hon. Mr. Moses returning triumphantly to Washington in a black shirt.

Measuring the Recovery Rate The Federal Reserve Board in its business and finance review reports that the prices for six basic commodities—cotton, lard, silver, copper, tin, and rubber at the end of May averaged about 60 per cent. higher than in February. It is significant, of course, as the report points out, that these commodities are ones freely traded in on organized exchanges and therefore likely to respond more easily to changes in business and finance.

Chemicals (aside from items in groups such as oils, fats, waxes, etc.,) have shown no such

sharp appreciation. Fortunately for the industry in the past forty odd months of depression the stability of the chemical price structure proved to be invulnerable to anything like the demoralization that took place in the six basic commodities mentioned. Even important salts did not, in most instances, approximate the loss in the corresponding metals. Various chemical price indices are modestly showing anywhere from two-tenths of one per cent. to one or two per cent. advances in the past six or eight weeks.

"Recovery", if measured only by one yardstick—sharply advancing prices—leaves the chemical field seemingly bringing up the rear in rather disorderly fashion. It is essential then to gauge improvement by other measures. In tonnage comparisons chemicals show up well, although here again some of the more speculative items show sharp rises because of the speculative element. If recovery in the chemical industry to some impatient few does not seem to keep pace with the stock market and the leading commodity markets, it is a relief to know that while it may be somewhat slower, it will be built upon solid and stable foundations.

The Conference and Chemicals A postponement of the London Economic and Monetary Conference (which seems likely as we go to press) will cause neither surprise nor grief in the chemical industry. There will be some disappointment, that so little of definite, practical value was accomplished, and some apprehension that the net returns of the meeting have been mainly an increase in international ill-will. However, no one familiar with the ways and means of such a conference will be startled that without a program and without prearrangement among the more important powers present, that so little should be accomplished, nor that the animosities aroused will be permanent.

Without doubt the most interesting outcome of the Economic Conference has been the crystallization in Great Britain and the United States of the feeling that in such uncertain times and amid so divergent plans for recovery that national self-sufficiency becomes almost a necessity. However closely knit the world may have become, as the internationalists have been preaching for so many years, there are, nevertheless, vast differences of industrial equipment and natural resources, of population, of wage scales, and of actual gold reserves that appear to be insurmountable difficulties in the way of establishing a world-wide economic policy. Under such circumstances, as we have often pointed out, the way to world peace and world prosperity lies in the recovery of the individual nations each working out their own problems in their own way.

From the narrow point of view of the American chemical industry, this is obviously to the advantage of our chemical manufacturers. The biggest chemical market in the world lies within our boundaries. Our chemical foreign trade amounts to less than five per cent. of the total. The restoration of American buying power and its attendant activity in American industry is very plainly the way to the better recovery of the chemical markets.

Quotation Marks

The machinery of the nation is out of order. We must run it as we find it. Its intelligent wheels, its rods, its belts are separated, but the boiler seems to be perfect. We must repair the work with such skill and ingenuity as we possess.—*Abraham Lincoln.*

We abhor self-satisfaction.—*Selfridge & Co.*

Organized effort, harmony in supply and fair dealing must characterize every industry. They may perhaps be more easily achieved by the newer industries than the old. It is to these new industries that we have to look to balance the inevitable decline in some of our older industries. Courage, originality and initiative are essential.—*Sir Harry McGowan.*

Practice without science is a boat without a rudder. —*Leonardo Da Vinci.*

Industry will begin to prosper again when it offers people articles which they want more than they want anything they now have. The fact is that people never buy what they need. They buy what they want.—*C. F. Kettering.*

Fifteen Years Ago

From our issues of July, 1918

United States faced with shortage of sulfur puts industry under Government control; also takes over chlorine industry.

The 50th birthday of Henry Howard, vice-president, Merrimac Chemical, celebrated recently at Tavern Club, Boston.

New oil works to cost $200,000 will be constructed by Gulf Refining Co. at Pittsburgh. Plant will consist of ten brick and steel units.

Swiss Colours Co. awarded a verdict of $2,500 against Jefferson Mfg. Co. for non-payment for dyestuffs. Defendant claimed dyes were not equal to samples, but Judge ruled that the delivery had been accepted.

Three men killed and several hundred thousand dollars damage done when explosion wrecks nitrate plant of Aetna Explosives Co. near Ishpeming, Mich. Cause of explosion unknown.

Grande Ecaille

Louisiana Again Bids for Sulfur Supremacy

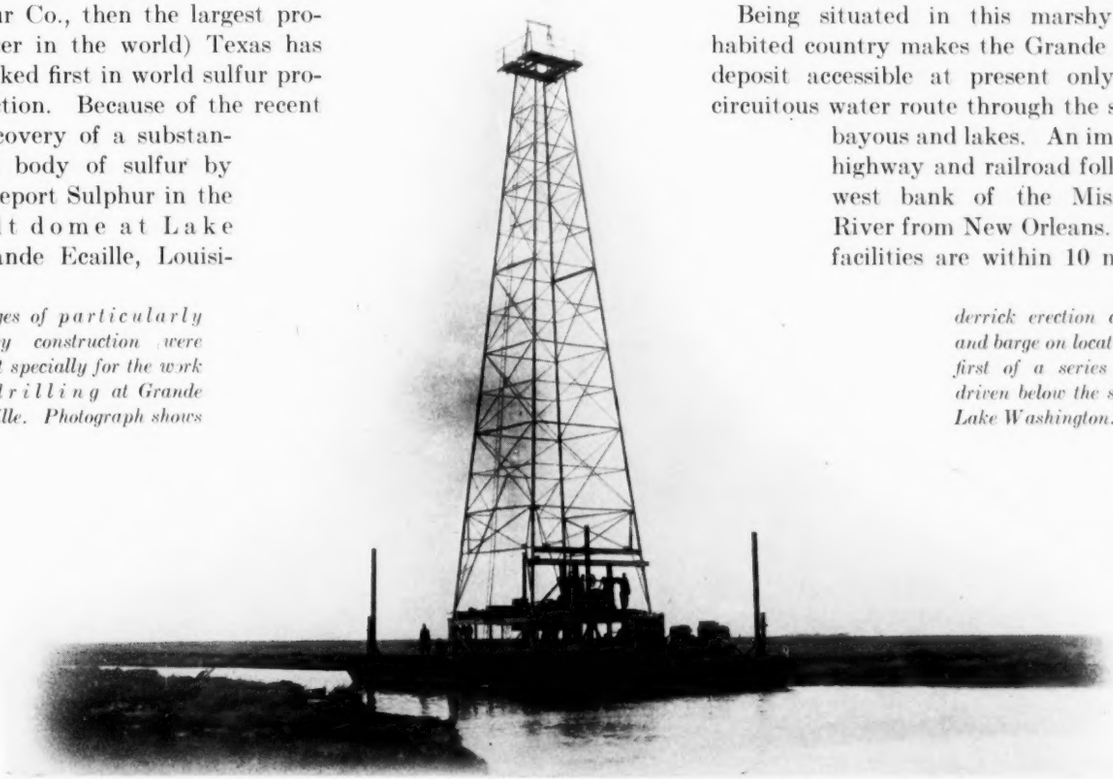
SULFUR companies constantly expend huge sums exploring for new sulfur reserves. Freeport Sulphur Company, producing unit of Freeport Texas Company, one of the two outstanding leaders in the field, has devoted attention not only to exploration but to actually expanding production facilities. Its operations at Grande Ecaille, Louisiana, about which much has been rumored, are of special interest not only from an economic and business viewpoint, but from the viewpoint of the mining engineer faced with unusual problems of construction. The project has now advanced to a stage where many of the details may be recorded.

Our major sulfur deposits are in the Gulf Coast region of Texas and Louisiana. The first deposit to be mined by the Frasch System was located in Louisiana. Since the depletion of this deposit in 1924 (owned by the Union Sulphur Co., then the largest producer in the world) Texas has ranked first in world sulfur production. Because of the recent discovery of a substantial body of sulfur by Freeport Sulphur in the salt dome at Lake Grande Ecaille, Louisiana will shortly regain her prominence in the sulfur market.

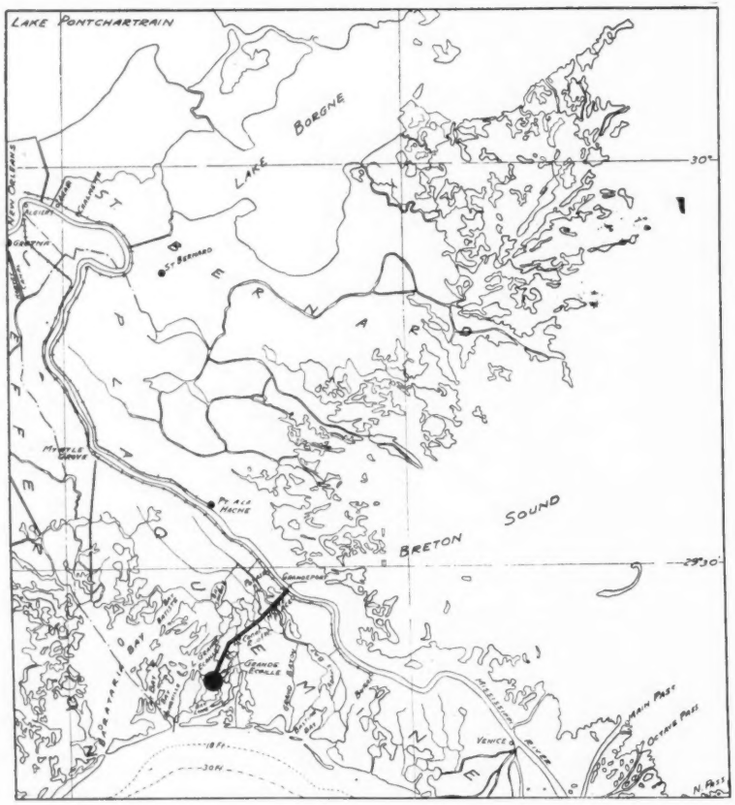
The Grande Ecaille salt dome (sometimes called Lake Washington) is located in Plaquemines Parish, La., on the delta of the Mississippi River 10 miles west of the present river bed and approximately 50 miles on an air line south from New Orleans.

The physiography of the delta region is characterized by low swamp lands interspersed by numerous shallow lakes, bayous, and lagoons. A more disheartening terrain for large scale production can hardly be pictured. Unfortunately, Nature, when it endowed the Gulf Coastal region with rich sulfur reserves, did not choose to make the winning of these by man an easy problem, and in many instances, as in this particular spot, seemed determined to tax man's ingenuity to the utmost before yielding to the insistent need by industry of sulfur of high purity.

Being situated in this marshy uninhabited country makes the Grande Ecaille deposit accessible at present only by a circuitous water route through the shallow bayous and lakes. An improved highway and railroad follow the west bank of the Mississippi River from New Orleans. These facilities are within 10 miles of



Barges of particularly heavy construction were built specially for the work of drilling at Grande Ecaille. Photograph shows derrick erection completed and barge on location at the first of a series of wells driven below the surface of Lake Washington.



Location of the sulfur deposit at Grande Ecaille. Large black circle represents mining site; dark line the 10 mile canal between Grande Ecaille and the shipping port, Grandeport, on the Mississippi River. New Orleans is approximately 50 miles north of the mining site.

the Grande Ecaille dome and will be available by the construction of a canal and a highway.

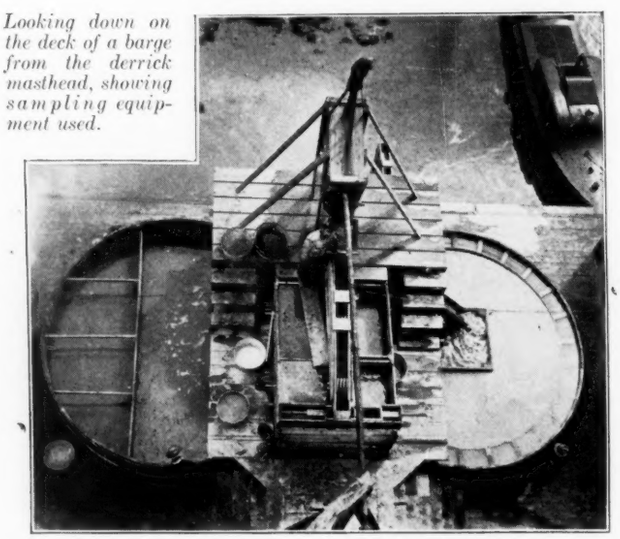
Although 90 per cent. of the surface of this dome area is composed of marsh land having an elevation of approximately two feet above mean low tide, yet the nature of the land is such that it has little or no bearing strength. The Biblical story of "building one's house on a shifting sea of sand" might easily be paraphrased to a sea of "ooze." Firm foundations took on more than an abstract meaning in planning the construction of the large manufacturing units in the terrain at Grande Ecaille. The soil to a depth of approximately 10 feet consists largely of a mud or ooze upon which a matte of humus and salt grass is virtually floating. Consequently the land areas support little or no load. Moreover, at extremely high tides these land areas are flooded. Pumping liquid sulfur from a dome covered with water is an engineering problem with many tricky angles.

Science played the initial act in the prospecting and development of Grande Ecaille. In a terrain such as described and especially where no surface expression or indication show an underlying structure, oil companies in the early days were not prone to drill. Prospecting in these inaccessible areas was left for geophysicists. By means of the seismograph in 1928 the Grande Ecaille salt dome first was made known. Subsequent drilling for oil and further geophysical work by means of the torsion balance determined its depth and outlined its area. The succeeding drilling has indicated a rich and extensive sulfur deposit.

Realizing the difficulty in drilling in this terrain, the Freeport engineers considered it most economical to build large barges to support the derrick and drilling equipment. The equipment consists of a steel barge measuring 36 feet by 80 feet and 6½ feet high, upon which is mounted a 96 foot steel derrick. The barges and several fast speed boats, tugs, etc., have been jocularly referred to as the sulfur "navy."

The usual rotary drilling equipment is used and is driven by gasoline engines. Miles of canals were dredged by means of clamshell dredge boats to the proposed well locations. The drilling barge was then towed by a shallow draft tug boat to the location and anchored. Four steel spuds, one in each corner, anchored the drilling barge. Each was a complete drilling unit and proved very economical and flexible. The delay or idle time which usually occurs in tearing down and moving a rig is minimized with this equipment because only a few hours are required to pull the spuds and to make ready for a change to a new location. Sampling of the rock structure was accomplished by means of corebits, sand pumps, and also with the reverse return system.

The rock structure of the Grande Ecaille salt dome lies at a depth of approximately 1,200 feet, being relatively flat on top but dipping steeply at the sides. Massive dense anhydrite inmediately overlies the salt plug. The mineralized zone, consisting of limestone and gypsum with varying amounts of native sulfur, occurs above the anhydrite. Although the drilling was confined to a small area of the dome yet sufficient ore reserves were proven to more than justify the construction of the production facilities now under way.



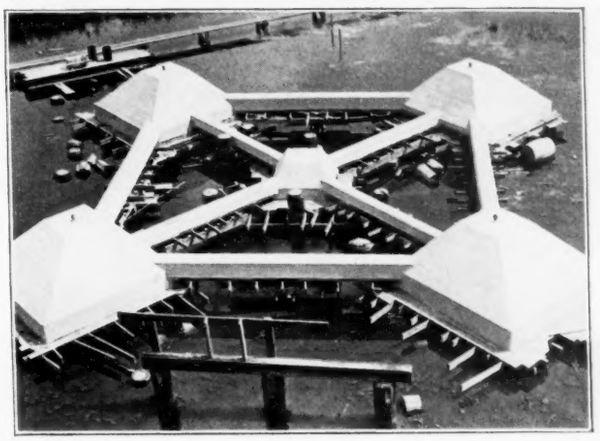
Looking down on the deck of a barge from the derrick masthead, showing sampling equipment used.

Additional drilling is still being carried on to determine as closely as possible the total ore present that is readily available.

Housing and sanitation problems presented themselves, due to the difficult country in which the dome is located. During the initial drilling period living facilities were provided in houseboats for about 40 men. In order to commence construction, however, additional housing facilities were necessary. This necessitated construction of a camp capable of housing 200 men. The problems (building upon piling) that were encountered in the construction of the camp helped to point out some of the difficulties that were to be encountered even in a more serious way when the foundations for the plant, warehouses, etc., were laid.

The mine plant for the Frasch System involves essentially a large heating plant, water treating and storage facilities, fuel and sulfur storage, pipe lines and auxiliary equipment such as warehouses, machine shop, blacksmith shop, office, laboratories. In addition permanent residences, churches, schools and business houses must be provided. In other words a complete city capable of taking care of the normal requirements of over a thousand men, women and children must be erected in a tidal marsh, in one of the most forsaken spots. Not only must these facilities afford an existence but must provide adequate recreation. Life must be made not only bearable but enjoyable.

A close-up view of the problems of construction successfully met at Grande Ecaille. Because of the extremely marshy land, all foundation work is reared upon a close-knit underpinning of piling.



Foundation for a large water-tank. Note the "tieing in" necessary because of the peculiar ground conditions.

No city planning commission has more problems to solve than the engineers supervising this work. A complete inspection of the work shows how thoroughly and how quickly solutions are found where red-tape is unknown. The fact that this area is subjected to hurricanes indicates but just one angle of the engineering difficulties.

The projects now under construction include the erection of a heating plant, water treating equipment, shops and other structures at Grande Ecaille. Also, hydraulic fills for the plant site, vat site and mining area. At the town site, Grandeport, which is located on the Mississippi River 10 miles east of Grande Ecaille, the erection of shipping facilities, residences, water pumping equipment, etc., is in progress. Aside from a few houses the shipping site is without any construction and a complete unit must be erected by the company. It is planned to bring ocean-going vessels

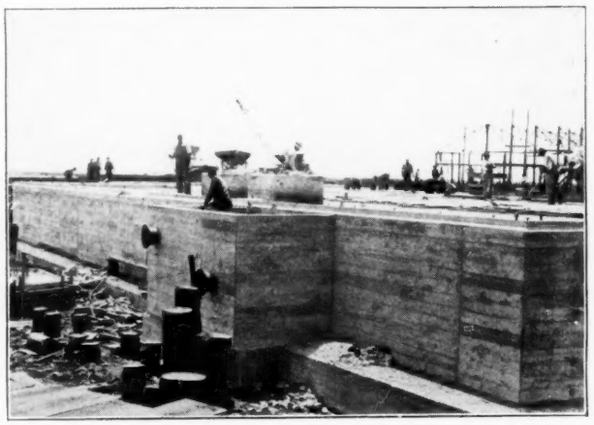
Grandeport, site of the shipping point on the Mississippi River. Here complete barge and ocean-going vessel loading equipment will be installed. A self-contained, small city must be erected at Grandeport.

to this point for loading. Between Grande Ecaille and Grandeport construction is under way on a canal, highway, pipe lines, power and telephone lines.

In the erection of the main heating plant (Grande Ecaille) approximately 3,500 of 75 foot untreated pile were necessary. These are driven approximately 2½ foot center and give a safe bearing strength of eight tons each. The peculiar type of foundation construction necessary is indicated in one or two of the accompanying pictures.

In the construction of the other buildings approximately 3,000 additional 75 foot pile and 2,000 of 50 and 60 foot pile are necessary. In the plant the piling cutoff is at an elevation plus 2.5 feet. A three foot concrete matte is being poured on these piles. The plant floor will be elevated to plus 12 feet and supported by columns and beams from the concrete matte. The space between the plant floor and the matte will be utilized for additional fresh water storage. Although the average daily tide variation rarely exceeds two feet, to preclude inundation during severe storms all buildings at Grande Ecaille are being elevated to approximately 12 feet. All buildings are being constructed of structural steel and composition sheeting and designed to withstand maximum wind velocity of 125 miles an hour.

To insure no subsidence of the plant buildings by the future extraction of sulfur, these buildings are being erected approximately 4,000 feet from the mining area. Midway between the plant and the mining area the vat site for sulfur storage is located. These three areas are being filled to an elevation of from eight to twelve feet, and joined together by a fill on which will be placed the highway and numerous pipe lines. These fills involve the dredging of over 2,000,000 cubic yards of dirt. The excavation of this material is now in progress by means of a 20 inch hydraulic dredge. The material is being secured from the bed of Lake Grande Ecaille, and in order to find suitable



All buildings at the mining site are erected on foundations similar to this one. An elevation of 12 feet places the plant and equipment out of all danger of unusually high tides.

filling material it is necessary to dredge to a depth of 40 to 50 feet.

The 10 mile canal from Grande Ecaille to Grandeport is being dredged by two three-yard clamshell dredge boats. All the excavated material is being placed on one side of the canal and it is expected to utilize the fill for a highway.

The land at Grandeport being at a higher elevation and firmer, will permit the construction of buildings with the use of but few piles. To insure the housing area against storm tides, it will also be filled. At this

A broad view of the East end of the plant. Picture shows very clearly several of the stages in the unusual construction methods employed.

location it is planned to erect more than 100 buildings including residences, business houses, schools, churches, etc.

Large quantities of fresh water and fuel are required by the Frasch system of sulfur mining. Approximately 3,000,000 gallons of water per day will be pumped from the Mississippi River into a 50,000,000 gallon storage reservoir located at Grandeport. From this point after settling the water will be pumped through two-14 inch welded steel lines to the plant at Grande Ecaille. After being treated for the removal of scaling and corrosive properties the water will be heated to about 350 degrees Fahrenheit and pumped through pipe lines to the wells in the mining area. Either gas, fuel oil, coal or petroleum coke will be used for fuel.

The liquid sulfur will be pumped to the vat site where it will be solidified and stored. Later it will be blasted and loaded by electric shovels onto a movable belt conveyor. The conveyor will discharge into barges which will be towed through the canal to the dock at Grandeport. The lump sulfur will be unloaded from the barges by an electric crane and placed either in storage or into an overhead belt conveyor which will discharge either into barges for river shipment, or into vessels for export.

The construction of all these facilities is rapidly taking place at an amazing rate of speed, inspection of both the plant and shipping sites discloses. It required one year's time for the initial drilling. Construction inmediately followed and it is planned to commence the production of sulfur early in 1934.

From time to time concern has been expressed about the future supplies of sulfur. Major developments such as the one taking place at Grande Ecaille seem to indicate that any such possibility is only the remotest kind of a possibility for many years to come.

Future of Chemical Employment

A Plan by D. H. Killeffer

It is scarcely probable that our world-wide economic depression will end with the same suddenness that it began; and it is unreasonable to hope for the early return of the day when everyone who chooses to call himself a chemist will be eagerly sought. Careful selecting of the man best fitted for each particular opening can be expected to continue indefinitely into the future; and it will be well for all that it is continued. It is only upon accurate fitting of individuals and needs that prosperity for either employers or employees can be built. That, if nothing more, has been the lesson we must learn from the economic debacle of the past three years.

Our purpose here is to analyze this problem and to suggest a possible way out. Relief is an essential but temporary palliative. We seek here a real remedy.

A fundamental economic fact of employment is often lost to sight among the complexities of modern living: not only is a worker worthy of his hire but he must be worthy of it. He must produce a value for his employer in excess of the wages he receives.

No business, corporation, group, or individual whose object is gain will dispense with the services of employees or departments which produce profit. It follows, then, that whether we like it or not those chemically trained men and women who have been separated from employment during the present depression have been to some extent and in some way failures *in the positions they occupied*. This is obviously so, since the overwhelming majority of that group has remained employed throughout the entire disturbance.

Normally, the activity of industry is sufficiently great to provide with reasonable promptness new places for those who failed to fit in the old; and the waste in the process of trial and error is easily absorbed and written off to profit and loss. This relative ease of shifting from one position to another under normal circumstances hides effectively the economic loss both to employers and to employees inherent in a process so thoughtlessly conducted as employment has generally been. If the same proportion holds among chemists as in general industry—and in the absence of better values we may assume that it does—the normal unemployment is about one-seventh of its present value. In other words, our present situation is merely an aggravation of a condition we have always with us. For chemically trained workers, as for others, it has meant that a larger proportion have become misfits, unprofitable to retain on the payroll and difficult to fit into new openings.

"Misfit Men"

Let us consider how men "misfit" and what can be done about it.

During the period which began a decade ago, chemistry and research became stylish in industry. The research laboratory, elaborately equipped and generously manned, became the fad of manufacturers everywhere, whether necessary or not. No executive felt that his organization was in step with the times until he had created a research department. The demand for men to work in them became so avid that any one even slightly acquainted with chemistry had no difficulty in securing a post. Profits seemed assured, and research the surest way to provide for their continuance.

This fad for research has, however, contributed in no small measure to the present and future problem of employment in our profession. The rather reckless handling of personnel which made research men of analysts, plant men, librarians, and salesmen, to mention only a few, was the result of an artificial demand for men to fill artificially created vacancies. In order to meet their requirements for men many organizations sent out scouts to choose the most likely prospects from the colleges and hire them on the spot, even before their graduation. Naturally many of these failed to fit, through no possible fault of their own; and because they had been originally selected to do some particular type of work, they fatuously held to the belief that they must stick at that. These men have not infrequently continued to be misfits wherever they have gone; and their goings have been often repeated for that reason alone.

In the near future the old process of trial and error is likely to prove too expensive, both to the employer and to the employee. Employers are not now in any position to send out scouts for the few new men they require; and it is not improbable that for some time to come it will be improvident to spend money with the old abandon even in so essential an activity as employment. Experience has taught employers that advertising for men brings flocks of applications from the misfits and few from the well qualified. It is scarcely less difficult to select the good men from the mass than to find them without advertising.

For employees, the risk of failure to fit has been materially increased by reduction in the number of opportunities to find other employment promptly; and there is little reason to believe that this scarcity of jobs is different except in degree from what the future holds for us. Obviously it is to the interest of both parties to the employment problem to have provided for them a more convenient and sure method of getting together.—*Abstracted from The Chemist.*

Depression in Plenty

A Criticism of the Weiss & Downs' Plan

By Henry B. Faber, D. Sc.

"DEPRESSION in the midst of plenty." That is the keynote of Weiss and Downs' article on "Farm Consumption vs. Factory Production." This was written by an analytical mind—a mind familiar with adjusting factors to solve an equation and a mind that is skilled in the art of evaluation.

The discussion of the McNary-Haugen equalization plan, the "Domestic Allotment Plan" and the plan described by Samuel Crowther of the *Saturday Evening Post* is well briefed and the essential facts of these plans are ably discussed.

The plan recommended by Weiss and Downs takes from each of the foregoing plans something of value and solves the equation in "A Simple Plan of Administration." In brief, it makes the Secretary of Agriculture a dictator as regards the price per unit on a specified domestic crop based on the normal expected harvest. The plan goes on to say "It would be unlawful for any person to purchase from any agricultural producer, or for any producer to sell at less than this minimum price."

The Secretary of Agriculture would place embargoes against the import of all competing farm products and would be empowered to lift the import embargo when there was a serious crop failure. In this article they hold that the farmers themselves and public opinion would police the individual.

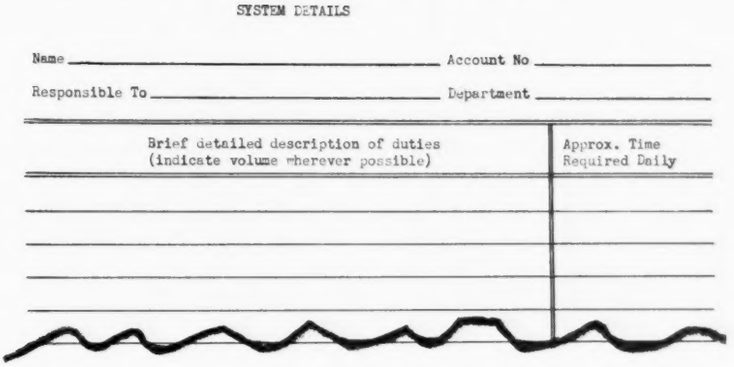
I fear this plan is a bit Utopian. The farmers of this country are the most independent factors of industry that we have. Their independence is innate and everything proposed with the semblance of federal supervision and price domination would, I believe, not be acceptable. The very phrase "it would be unlawful" would put an insurmountable obstacle in the path of this proposal. The basic principles outlined in this article are excellent, but the human element which will go far to make or mar the plan has not been given enough emphasis. The farmers in this country of ours are more independent than anywhere on the face of the earth. Their independence is hereditary. There is much of the frontier man and pioneer in their makeup, and the farmer does not understand or realize what the manufacturer has had to realize regarding Federal supervision, quoting from Dumas "All for one and one for all!" Not that the farmer would revolt against any legal price fixing that would benefit him, but intuitively his tendency would be that the law should not take a hand in his private affairs.

There is a conspicuous example of the same relative formula that Weiss and Downs have suggested in their article. I refer now to the California Fruit Growers' Association. There the fruit growers banded together for their own protection. No one was compelled to join the association, but the members voluntarily accepted their dictum.

If Weiss and Downs' plan could be freed from Governmental restriction and the farmers would band together and fix their own prices and limit their own production, then the plan would avoid the exaction of Governmental control and any semblance of legal compunction.

As a constructive factor I have this to suggest:—that the Government, as it has wisely done to a limited extent, continues to place the farmer in a position whereby he can amortize his mortgages over a period of time that will relieve him of the urge for over-production to avoid foreclosure. This, I think, is the primary basis of the help that should be given at this time. The price of farm products is predicated on supply and demand and always will be unless the farmer recognizes and willingly joins in with the plan of reasonable curtailment,—but that has to come voluntarily and not by a process of law.

What Price System?


SYSTEM DETAILS

Name _____ Account No _____

Responsible To _____ Department _____

Brief detailed description of duties (indicate volume wherever possible)	Approx. Time Required Daily

By Frank Klein
Director Budgets, Worthington Pump & Machinery Corp.

FAILURE to face the facts of contracting business and commodity prices led countless thousands to overstay the stock market in 1929 and to continue to hold securities during three years of shrinkage. Similar hesitancy among business executives to meet indicated conditions has been responsible for many of the losses reported during the past few years. Perhaps determination by executives to see facts as they are, and to adjust their actions accordingly, is one of the most cheerful signs on the business horizon.

Painful though it may be, it must be recognized that present sales measure the size of the business, and that expenses must be in proportion to those sales. This article is intended to indicate a source of expense reduction overlooked in many organizations up to the present time because of such failure to recognize the shrinkage in the size of the business.

During a period of increasing business at high selling prices, and sometimes with forced production methods, many expedients are developed to cope with the various situations which occur under such circumstances. Because of the inability of executives to give individual attention to the many phases of their business, system is developed and expanded to automatically bring all facts to their attention. Reports are designed to meet the demands of the times. Statistical data are accumulated on certain existing conditions. Large profits, with the possibility of still greater returns, justify this extension of system details, and the cost of the system is frequently negligible compared to the returns made possible through an intelligent use of it.

But with the curtailment of business, the elaborate system and sets of reports and statistical data, designed when volumes of sales were several times greater, and when expense was not the paramount issue, are frequently retained intact. Under these conditions it is not unusual to find organizations with as many indirect workers employed on the system details, as there are productive workers in the plant. And it is this tendency to retain the old routines under radically changed conditions that leads business men to believe that there are certain non-variable classes of labor expense regardless of productive volumes.

Those departments which appear to be busiest in times of reduced volumes are frequently the most fertile fields for curtailment of routine and expense. It is well recognized that the effort required to operate the various accounting, production, statistical, and other divisions, will vary little with changing volumes of business. It is natural then, that so long as the elaborate systems of former years are retained, the staff necessary to operate them, together with the various forms and records must also be retained. If this class of expense is to be brought into line with current conditions it is essential that the system itself be modified to conform to present requirements, both as to current needs, and expenses therefore.

Probably the most effective way to make a revision of this kind, is to make a complete survey of all so-called paper work now being performed in the business.

For this purpose a form similar to that shown herewith might be handed to every employee engaged on record or system details. The time employed should be apportioned over the various duties, and names or numbers of all forms used should be stated. This complete inventory of all duties will doubtless bring to light a number of records and reports of little use under present conditions. Occasionally a departmental head initiates a record to meet his particular requirements and turns it over to an employee to continue. Later a new supervisor comes into the department and has records prepared to meet his own ideas, but the old ones are continued parallel to them.

Records and System

But of greater importance in the survey are the major records and reports so often accepted as a fixture of the business. If the rates of the employees engaged on the various details of system are apportioned to each such detail, the total cost of any record or routine, as well as the total cost of the organization's system can readily be obtained. The test should then be, whether the cost is commensurate with the present return. Objection is sometimes raised to the discontinuance of certain statistical data on the ground that it will prevent comparisons with the past and future performances. The answer is found in the fact that comparisons of present operations with those of the past mean practically nothing. They may be interesting, but are not helpful, and similarly, present operations when compared with those of the future when entirely different price levels and conditions exist, will be valueless.

Perhaps the best test of what the business should have in the way of system is what would be required if the business were just being established. Only the most simple and direct methods of control would be initiated. If certain procedures were suggested in order that they might be adequate for handling several times current volumes, and if they involved hiring a staff to operate them until such increased business were obtained, the wise executive would certainly defer the installation of such procedures until increasing volumes made them necessary. Why, then, is it not equally wise to simplify present systems to the same basis?

The ramifications of paper work reach out from the placing of the order, on through the purchasing, processing, shipping and invoicing of it. How many copies of the customer's order are written; how are they distributed; where are they recorded; what incidental records do they involve? This is only the beginning. Usually each copy multiplies itself in other forms, until by the time the order is invoiced an amazingly large number of entries and writings have been made, each of which has involved a definite amount of expense. At the same time, or shortly afterward, another series of records are compiled to show the results of the operations from various angles and viewpoints. How many could be entirely eliminated, or, by slight modification be made to serve in place of two or more other forms, without materially handicapping effective control? It is not unusual in a moderate sized organization to effect an elimination of several hundred thousand copies of forms a year, with savings in clerical expense of from twenty to forty per cent. This may sound like exaggeration at first, but when a survey like the one indicated above is made, the possibilities quickly become apparent.

No surer way can be found of placing business on a sound basis than by carefully reviewing in a detached way every phase of its operations. Neglect to take advantage of any opportunity to reduce needless expense handicaps the organization in its competitive position and is unfair alike to the owners, and to the employees whose positions are dependent upon the continued sound operation of the business.

Mercury, 1932

Figures covering mercury output in 1932 according to the Bureau of Mines indicate that 12,622 flasks, with a calculated value of $731,129, were produced. These figures represent decreases of 49 per cent. in quantity and 66 per cent. in value, from the 24,947 flasks, with a calculated value of $2,179,145, produced in 1931. The average quoted price of mercury was 34 per cent. lower in 1932 than in 1931.

The monthly average price was $64.90 a flask in January, rose to $72.54 in March, the highest average for the year, and then declined steadily until it reached the lowest level for the year, $47.44, in August. The price improved slightly in the closing months of the year and was $48.50 in December.

The production of mercury in California in 1932 amounted to 5,172 flasks, 41 per cent. of the country's total and 62 per cent. less than the output in 1931. Oregon produced 2,523 flasks, one-half of the amount produced in 1931. Production in Nevada dropped from 2,217 flasks in 1931, to 474 flasks in 1932, a decline of 79 per cent. Washington produced 407 flasks of mercury in 1932, compared with 560 flasks in 1931. Production in Texas was larger in 1932 than in 1931. Production was expanded in 1932 also at the newly discovered properties in Arkansas that recorded their first output of mercury in 1931. The total output for Texas, Arizona, Arkansas, and Alaska was 4,046 flasks for 1932, compared with 3,711 flasks in 1931.

The principal mercury-producing properties in 1932 were: The Parnell Hill mine, Pike County, Arkansas; the Manzanita mine, Colusa County, Great Western and Mirabel mines, Lake County, Aetna mine, Napa County, New Idria mine, San Benito County, Oceanic, and Rinconada mines, San Luis Obispo County, and the Altoona mine, Trinity County, California; the Reward group, Mineral County, and the Castle Peak mine, Storey County, Nevada; the Black Butte mine, Lane County, and Bretz and Opalite mines, Malheur County, Oregon; the Big Bend, Chisos, and Rainbow mines, Brewster County, Texas; and the Consolidated Mercury and Washington Cinnabar mines, Lewis County, Washington.

Imports (general) of mercury in 1932 were 8,114 flasks, compared with 356 flasks in 1931 and 2,943 flasks in 1930. Of the total imports in 1932, 4,554 flasks were credited to Spain and 3,447 flasks to Italy. Imports for consumption were 3,886 flasks. Stocks of mercury in bonded warehouse increased from 88 flasks at the end of 1931, to 3,840 flasks at the end of 1932.

Exports of mercury in 1932 were 214 flasks, compared with 4,984 in 1931.

"Seasonal Variation"

How It Is Measured and What It Means in the Chemical Industries

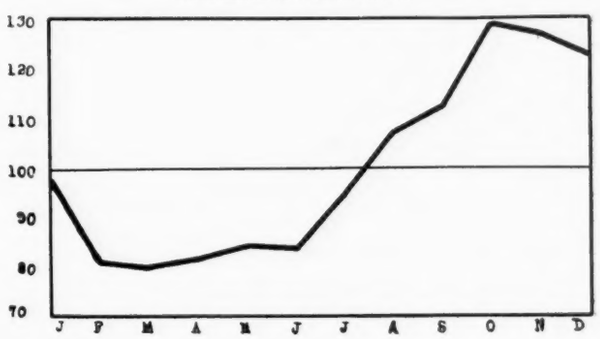
By Joseph Kalish

WHEN a graph is constructed to show desired data for convenient time intervals, the resulting line or curve practically always is neither smooth nor regular. Statistically, these variations may be classified as due to seasonal variation, to secular trend, to cyclic changes and to irregular phenomena.

The last for the most part are unpredictable and may be caused by strikes, currency revaluation, crop failures, etc. Concerning business cycles, which are best examined statistically, an extensive literature, still in a state of flux, has developed. Trend is the average movement of the data over an extended period of time, and the inexperienced have recently learned again that a trend line will suddenly change its direction, making untutored guesses as to its future movement wholly ridiculous.

Finally, seasonal variation is the regular change occurring in data in specific weeks, months or quarters caused by the recurrence of regular consuming or producing factors, etc. For the most part this type of variation is mentioned only when it is removed, as in carloadings, steel-mill operations, indexes of employment, adjusted for seasonal variation. The adjustment removes some of the irregularity inherent in the raw data and brings trend into greater prominence; in fact, without this adjustment a false trend might easily be indicated. For example, in alcohol production, the original data indicates a substantial increase from February through November 1930; corrected figures indicate only a slight upward trend. Original data indicates increasing superphosphate production in the last half of 1930, while adjusted figures consistently declined in the same period. Only the latter are a proper basis for judgment. Comparison of monthly data with that of the same month in past years rather than with the previous month of the

Alcohol Production



INDEXES OF SEASONAL VARIATION

Data from Annual Supplement Survey of Current Business 1931

Month	*Alcohol Production*		*Superphosphate Production*		*Gum Turpentine Receipts*		*By-Product Coke Production*		*Plate Glass Production*		*Acetate of Lime Production*	
	Index	*% of year*	*Index*	*% of year*	*Index*	*% of year*	*Index*	*% of year*	*Index*	*% of year*	*Index*	*% of year*
January	97.6	8.1	118.0	9.8	28.6	2.4	102.2	8.5	97.1	8.1	110.7	9.2
February	80.7	6.7	100.6	8.8	17.4	1.5	95.9	8.0	95.6	8.0	101.5	8.5
March	79.8	6.6	98.8	8.2	23.3	1.9	105.4	8.8	108.6	9.1	112.8	9.4
April	81.2	6.7	95.9	8.0	74.7	6.2	101.3	8.5	103.6	8.6	106.1	8.8
May	83.9	6.9	87.8	7.3	140.8	11.7	103.2	8.6	105.7	8.8	103.3	8.6
June	93.5	7.7	86.6	7.2	163.7	13.6	98.3	8.2	100.6	8.4	91.4	7.6
July	94.3	7.8	90.6	7.6	170.7	14.2	98.5	8.2	95.3	7.9	86.1	7.2
August	106.9	8.8	92.6	7.7	152.3	12.7	98.8	8.2	103.4	8.6	90.2	7.5
September	112.2	9.3	91.1	7.6	132.6	11.0	96.8	8.1	100.8	8.4	87.5	7.3
October	129.2	10.7	114.8	9.6	111.2	9.3	101.6	8.5	105.2	8.8	99.3	8.3
November	127.2	10.5	108.7	9.1	93.3	7.8	98.4	8.2	98.5	8.2	105.3	8.8
December	123.1	10.2	114.3	9.5	91.8	7.7	100.3	8.4	85.9	7.7	105.2	8.8

same year is an attempt to make this adjustment qualitatively, but generally gives only the crudest measures.

Indexes of seasonal variation for each month, as shown on the accompanying charts are expressed as percentages of the monthly average, and to make adjustments, the original data are divided by these indexes. Incidentally, although many different methods of calculating these indexes are known to statisticians, any of the generally approved calculations yield practically indentical results. It is to be noted, however, that these figures are averages and may therefore vary somewhat from the "true" values. As

By-Product Coke Production

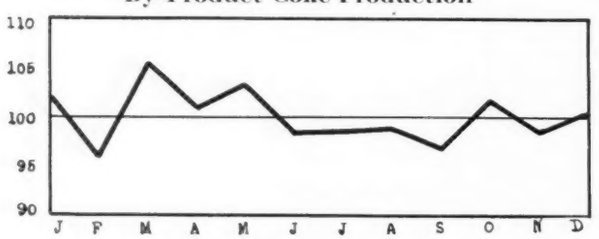
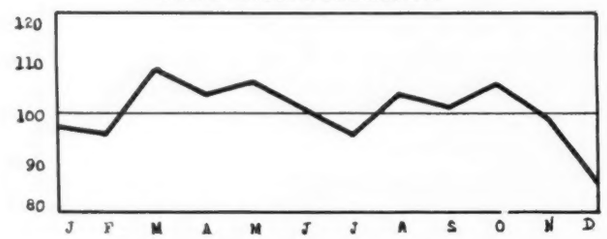


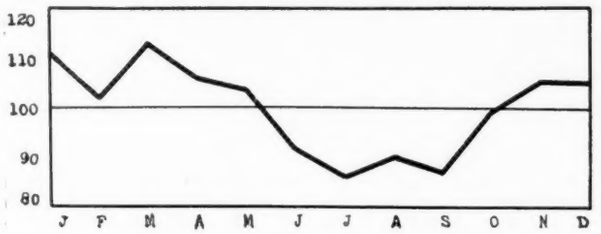
Plate Glass Production



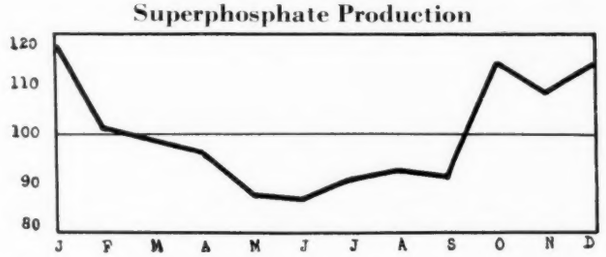
an example, the January index for by-product coke production says that 8.51 per cent. of the year's production will occur in that month; actual percentages for the years 1924 to 1930 vary from 8.08 to 9.22.

Indexes are less frequently given for individual months as percentages of the whole year, but in this form they may be very useful. Concerning quantities, in this form they indicate what proportion of the total production may be expected in a given month, or what proportion of the consumption. Thus the curves clearly show peak production of alcohol in October and November, anticipating and responding to antifreeze demand. Greatest production of superphosphate is in October, November, December and

Acetate of Lime Production

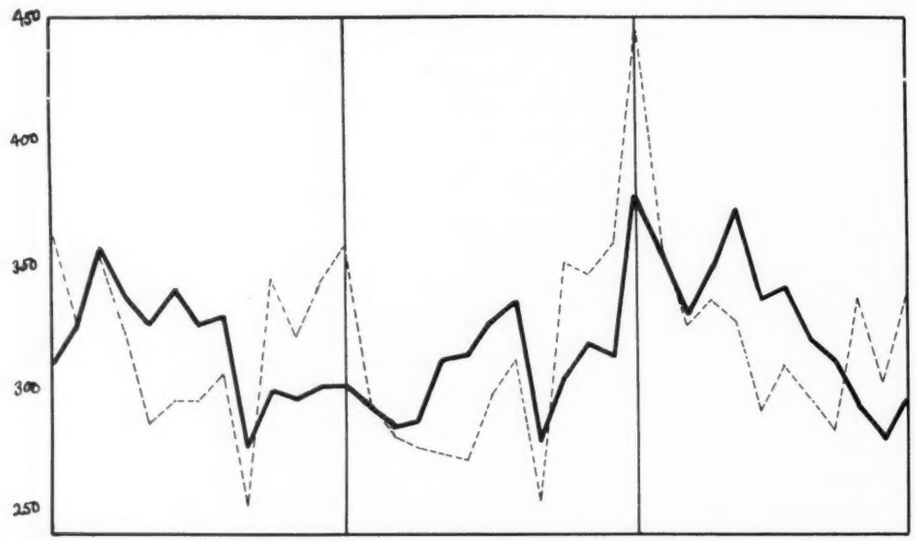


Superphosphate Production

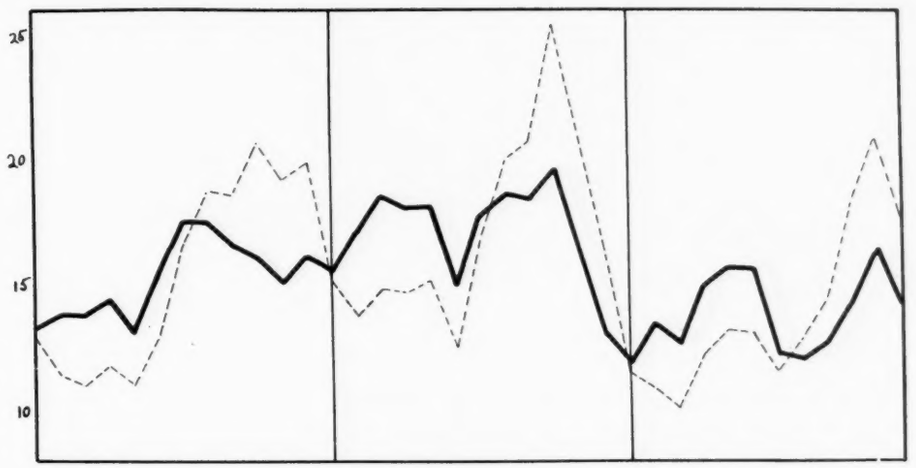


January. Contrasted with these are acetate of lime production, at a minimum in July, August and September, with maxima at January and March. Production in February does not actually decrease, but the 28 day month will naturally give a smaller total than the 31 day months. Gum turpentine (and rosin) exhibits extreme variation in production due to the definite tapping season. By-product coke production is important from the chemical point of view for it gives a direct measure of supplies of coal-tar crudes.

As measures of chemical consumption, superphosphate production registers demand for sulfuric acid and thus for sulfur and pyrites. Plate glass production provides a measure for some of the consumption of raw materials entering into the manufacture of glass, such as silica, limestone, soda ash and sodium sulfate. Quarterly indexes of the factory consumption of crude coconut oil (as a measure of some of the con-



Superphosphate production in 1,000 tons—adjusted. Chart indicates the movement over a three year period.



Alcohol production—millions of proof gallons—adjusted for seasonal variation. As in the chart on the previous page the trend is indicated over a three year period.

sumption of caustic soda) were calculated but are not shown as they are quite constant and indicate little variation in the rhythm of operation. In these and other cases, correspondence between production of a finished product and demand for a raw material may not be exact, as there is sometimes a "lag" of from one week to several months between the two, depending upon buying and manufacturing habits in the respective industries. Assuming a constant trend, it is possible to use monthly percentages cautiously to estimate the annual totals.

From the financial aspect, quantitative measures of seasonal variation provide a means of estimating corporation profits in advance of financial statements. Where a company primarily produces for one or a few industries, data of seasonal activity in the latter can be made a measure of gross income for the corporation. In general, seasonal variation in the production of commodities, taking into account price changes, will determine periodic changes in the gross income of companies producing and selling the commodities.

Finally, once seasonal change has been measured and found to be large enough to result in losses through idle capital, unemployment and erratically distributed fixed charges, it devolves upon management to reduce and possibly eliminate these losses, assuming that the production and consumption cycle cannot readily be changed, which is true in most cases. The next step points to diversification of output. As an entirely theoretical instance, the alcohol producer should not undertake to manufacture superphosphate, because seasonal movements in both industries are very similar, with activity in summer months at a minimum. The combination of alcohol manufacture with an industry with movements like those in by-product coke manufacture appears desirable, however, in this single aspect, for in the first half of the year coke production is at a maximum and alcohol at a minimum, while in the second half-year conditions are reversed. Naturally, combinations of this type would result in increased, rather than decreased losses, if the two organizations were wholly or greatly decentralized; enough cooperation must be had to keep the same money turning over in both branches, and to reduce overhead.

These instances have been selected from readily available, published data and many could be chosen. In addition, the company with its own figures and the trade association with comprehensive data for a definite branch of industry, can profitably engage in more intensive study. Statistical methods are useful tools which should not be neglected merely because they are so frequently used incorrectly.

Aluminum Salts Industry, 1932

To supply the mineral and chemical industries promptly with data on aluminum salts production and markets during the year, the following information is furnished by the United States Bureau of Mines.

The production of aluminum salts in the United States in 1932 was 312,862 short tons, valued at $7,593,835, a decrease of 11 per cent. in quantity and 13 per cent. in total value from 1931.

Aluminum salts, produced in the United States, shipped in 1931-1932

	1931			1932		
Salt	*Number producers reporting*	*Short tons*	*Value*	*Number producers reporting*	*Short tons*	*Value*
Alum:						
Ammonia	5	4,668	$251,066	5	3,889	$202,216
Potash	3	2,086	111,168	3	2,098	108,345
Sodium aluminum Sulfate	3	15,907	905,184	3	16,341	888,607
Aluminum chloride:						
Liquid	4	1,588	60,685	5	1,829	105,669
Crystal, Anhydrous	2 & 3	5,533	560,175	2 & 4	2,070	222,443
Aluminum sulfate:						
Commercial—						
General	10	291,875	5,951,392	11	259,167	5,276,409
Municipal	10	11,509	193,450	10	10,954	165,905
Iron-free	7	15,108	483,060	7	14,017	428,523
Other aluminum salts and hydrate	4*	2,797	219,850	4*	2,497	195,718
	..	351,071	8,736,030	..	312,862	7,593,835

*Two producers each of alumina and sodium aluminate.

The makers of aluminum salts consumed 99,483 long tons of bauxite in 1932, valued at $1,087,000 at consuming works, and 2,713 short tons of aluminum hydrate.

Exports of aluminum sulfate from the United States in 1932 were 21,550 short tons, valued at $462,954, compared with 27,668 tons, valued at $568,490 in 1931.

Zinc Production

The world production of zinc during 1932 has been estimated at 780,108 tons, a decrease of 230,090 from the 1931 output. Included in last year's total were 398,447 tons from Europe; 301,352 tons from America; 50,309 tons from Australia; 30,000 tons, Asia; 41,955 tons, Germany.

Why Chemists Fail in Industry

By Dr. J. E. G. Harris

ALONGSIDE almost any chemical equation can be written equivalent statements which are of the utmost importance to the industrialist. The chemical substances themselves must be considered not as so many molecules of pure textbook material, but as so many hundredweights or tons of pure or crude substances, purchasable in large or small lots, delivered packed or naked at works, at definite prices and discounts which may fluctuate for many curious reasons. Thermochemical data cease to be a question of a few calories on one side or other of an equation; they become a matter of pounds of coal, or units of electricity consumed. The ubiquitous H_2O, which runs through all our equations, becomes something of supreme significance, which may need to be added at much cost or removed equally expensively.

Reactions, which in the laboratory one lightly described as "reversible," must be rigidly controlled or cajoled till they run in one direction only. The incidental precipitate which, in the textbook, is casually "filtered off and removed," in the industrial process may choke every filter known to science; even if removed successfully it is something the firm has paid for and represents a dead loss if not disposed of usefully, or at least in a way which will not offend the sanitary authorities.

Knowledge of Economics Essential

Everything is a question of cost, expressed in terms either of time or money—materials cost, labor cost, selling costs and fixed costs—and it is here that the average research chemist is usually lacking in knowledge.

Every industrial chemist should have some knowledge of business principles. Without this he is not only ill-equipped to further his own discoveries, but he is also liable to earn and even deserve, a certain measure of contempt from his business colleagues.

It is largely this inattention to business matters on the part of the majority of industrial chemists that has caused the management of so many of our industries to be in the hands of business men rather than technical men. There are also other reasons. One is largely a lack of certain opportunities on the part of the chemist, the dice being loaded against the chemist from the beginning.

This arrangement is not the best. There is a mean course which is seldom taken. For the good of the chemist, the business man and the firm itself, the responsibilities of management should be more equally shared.

Duplications of Investigations

One of the greatest causes of unremunerative expenditure on so-called research work is the unnecessary duplication of investigations. Speaking of my own experience, after I graduated I was given a small research problem by my teacher, Professor J. Norman Collie. The first thing he did was to banish me to the library to comb the literature for everything done or suggested along this line. This preliminary survey took weeks, during which time the laboratory knew me not. It was, however, one of the most useful periods of my life. In the first place, I began to learn my way among the literature of chemistry. I learned to pilot my course through Richter, Beilstein and Friedlander, and to branch off from them into the various journals of the world's scientific societies. Also, I found it advisable to polish up my small knowledge of French and German. During my reading, I saw my own trifling ideas and inspirations forestalled, proved or disproved, but I may say that I learned my subject thoroughly and, in the end, I was able to begin my own investigations more or less exactly where the last worker left off.

As many chemists of experience know, especially those who have had the advantage of beginning their research career academically, this clearing of the ground is essential, but it is not fully realized by the young research chemist, whose fingers itch for the test-tube, nor by many research chemists who have been brought up exclusively in industrial circles. It

Abstracted from a paper read before Institution of the Rubber Industry.

is even less understood by most employers. Few of the latter can restrain themselves at the sight of a "highly paid" research chemist merely reading. Yet, anyone who has, for example, had the conduct of patents through the patent office, will admit the amount of ignorance displayed even by serious and well qualified workers of previous research in their own field, and the amount of money which is wasted annually, obtaining results which are already on record and available for the price of a few hours reading.

The first thing a research chemist should learn is the use of the chemical literature. Chemists should have reasonable access to libraries. Not every firm can afford a big library, although compared with other business charges, the cost of a useful chemical library is not great, but the management should not begrudge time spent by their workers in the adjacent libraries belonging to universities, scientific societies or municipalities.

Different Lines of Investigation

The first stage in any research is reading; then comes experiment. It is impossible to lay down any definite rules, as so much depends on the nature of the problem. The preliminary experiments should be conceived as broadly as possible, so that a wide field is covered in a general way. They should be amply recorded, and no result, whether positive or negative should be neglected when writing up the day's work. Some observers keep two kinds of notebook, one for rough observations and the other a kind of fair copy. Some workers write the full story while it is fresh in their mind, but for those who cannot follow this method a rough notebook is definitely to be preferred. Detailed analytical investigations are as a rule not necessary at this stage; all that is required is an approximation which expresses results broadly in a comparative manner. Sidelines, however fascinating, should not be pursued, although full notes concerning them should be made, to be followed up as opportunity arises. As far as possible, all specimens and incidental products which appear of the slightest interest, should be filed away for future attention. The precipitate thrown in the waste bin today is always the one we need desperately tomorrow. Full notes regarding all materials used should be made and reference samples retained. Where absolutely pure materials are unobtainable, it is important not to pass on to a new delivery, until its suitability has been tested in the light of the last batch. Many a result, which has been ascribed to some experimental modification deliberately introduced, has eventually been found to be due to a new lot of solvent or catalyst.

It should be unnecessary to tell research chemists not to vary more than one factor at a time. It is irritating to obtain a result which may be due to either or both of certain new features introduced simultaneously. Begin with pure chemicals. There are classical cases where unsuspected impurities have been responsible for beneficial reactions, but far more cases where such impurities have hindered them. If you must begin with impure materials, you should at least know how impure they are and what the impurities consist of. One should never be in the position of the man who cannot repeat an experiment because he has not controlled his initial material. In industry you will often be tempted, and sometimes almost forced, to use crude materials, but do not do it, even though you know that any process evolved will finally be run with chemicals of commercial quality. Find the possibilities of the very best conditions and then you have a standard with which to compare the results obtained under the conditions which are actually practicable in the large scale.

A very common failing of research chemists, is the inability, or disinclination, to criticize their own results. Optimism should show itself in our methods of approach, but not in the results. If we have to give estimates to our business friends we should put forward the lower approximation when we are discussing yields and the higher one when discussing costs. It is a fairly safe plan to add to the result of most researches what I call a "pessimism factor," equal to about 10 to 15 per cent., representing the difference between what we have obtained under favorable conditions and what we are likely to obtain in the earlier stages of bulk manufacture.

There are many types of industrial research. Some fortunate individuals have a clear, even if limited, field, in which they can move almost unfettered, freely prospecting for any interesting development which may touch their own line even remotely. Usually only a few chemists in large combines, or in State laboratories, have this privilege. Most of us have definite lines of inquiry laid down, governed strictly by commercial demands; often our research consists merely in improving or cheapening an existing process, or investigating failure on the plant. Even these researches may have their bright spots, however, and some day or other we may make an actual discovery, which may even be developed into an "invention."

Inventions

It is important that the research chemist should know what to do in such circumstances. As we all know, it is possible to work new inventions secretly, in which case there is little or no redress against a competitor who makes the same discovery and cuts into our own field. On the other hand, we can take out a patent—which is a bargain between the State and ourselves—by which our invention receives protection against infringement for a term of years, in exchange for certain fees and the publication of methods. The patenting policy of a firm is decided by the management, but every research chemist

should possess some knowledge of the patent laws.

The research chemist has much to consider when he puts the results of his laboratory work into practice, and he will do well to "hob-nob" with engineers so as to profit from their experience of plant and materials. He should remember that engineers have in their direct charge large quantities of valuable and mysterious plant and machinery and are therefore respected by the management, so that their friendship and co-operation is a real asset. There is a danger of the chemist becoming at times rather subordinated to the engineer in industrial matters and he should use all his powers of tact and endurance to guard against this. The great thing to remember is that the engineer is the guardian and supplier of what represents his test-tubes and flasks but, just as he would not allow any laboratory furnisher to control his chemical work, so he must try, on the plant, to maintain the same attitude toward the engineer. Of course, cast-iron pots cannot be scrapped like test-tubes and one cannot re-design plant with a few lengths of glass tubing and a blow-lamp. Nevertheless, the co-operation between the chemist and engineer should be from the point of view that the chemical process in the main determines the form of apparatus, and not *vice versa*.

Another criticism of industry in this country is that we are slow to scrap obsolete plant and to take advantage of advances in machinery. The chemist, in conjunction with the engineer, should always be ready to weigh up the financial benefits to be obtained by expenditure on modern apparatus against the losses due to relegating old plant to the scrap heap. Low yields, expensive repairs and reduced output soon eat into any economies made by working plant which is past its peak period of usefulness.

Co-operation with the Plant Executives

Just as co-operation is necessary between the chemist and the engineer, so is it necessary between the chemist and the business man of the firm. The business man is very often directly responsible for the selection of the work undertaken by the chemical staff. He has an opportunity of learning the needs of the industry greater than that of the cloistered chemist, since he is in personal touch with customers and competitors as regards new requirements and also knows where the shoe pinches in the matter of prices. The business man should discuss these points frankly with the research chemist, on the common ground of mutual interest. He should give the chemist, and the chemist should be trained to seek, all the necessary information which normally does not filter through into the laboratory.

The question of raw material supplies, for example, is a complicated one. A cheap starting material in the North of Britain may be expensive in the South when loaded with freight charges. Concessions in the purchase of different fuels or power may be available, rendering the use of one of them more economical and so influencing the choice of processes. The kind of labor available for the hoped-for process may also decide the initial line of attack in the laboratory. The question of the nearness of the market has to be considered and the available means of transport,both for finished article and raw material. By one path a cheap, but readily salable by-product may be obtained, whereas by another a potentially valuable material may be produced which, in view of local circumstances, may be a drug on the market. On all these points the business men of the firm should impart information as freely as possible and not treat their specialized knowledge as a secret asset which raises them above the technical workers, as they so often do, while the chemist himself should realize the connection between prime costs, oncost and selling prices.

Molybdenum Industry in 1932

Production of molybdenum ore in 1932 amounted to 363,400 short tons, which yielded 2,616 short tons of concentrates carrying an average of 85.21 per cent. or 4,458,000 pounds of molybdenum sulfide (MoS_2), equivalent to 2,675,000 pounds of metallic molybdenum. In 1931, production was 434,400 tons of ore which yielded 3,038 tons of concentrates carrying an average of 85.93 per cent. or 5,221,000 pounds of molybdenum sulfide, equivalent to 3,132,700 pounds of metallic molybdenum. Shipments of concentrates from mines in 1932 contained an equivalent of 2,616,700 pounds of metallic molybdenum having an estimated value of $1,308,000, compared with shipments in 1931 of 3,157,000 pounds of molybdenum, valued at $1,577,000.

In 1932, as in other recent years, the Climax Molybdenum Co., at Climax, Lake County, Colo., and the Molybdenum Corporation of America, at Questa, Taos County, N. Mex., were the principal producers and shippers. In addition, a small quantity of high-grade concentrates was recovered and shipped by Hugo W. Miller, who concentrated some crude ore from the Santo Nino mine at Patagonia, Santa Cruz County, Ariz.

Molybdenum in ore and concentrates produced in U. S.

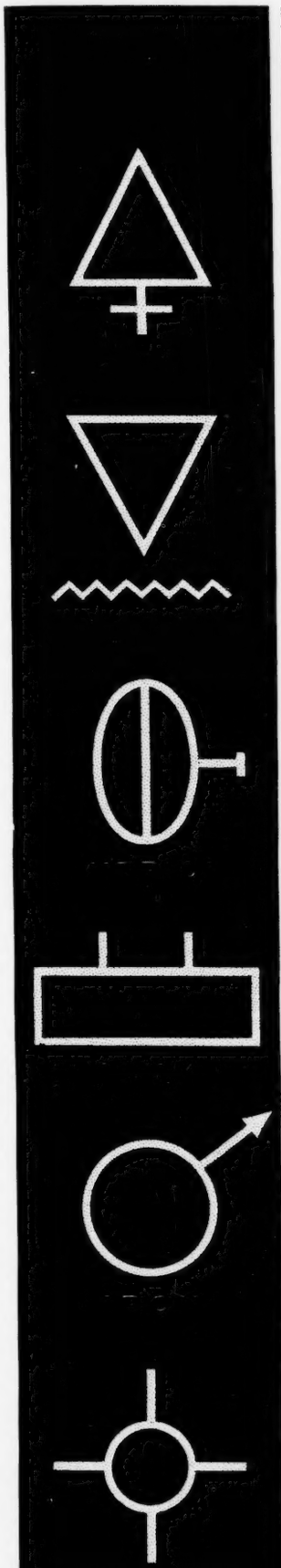
Year	*Pounds*	*Value*
1928	3,329,214	$1,924,600
1929	3,904,648	[2]2,259,000
1930	3,759,269	[2]2,068,000
1931	3,157,000	[1]1,577,000
1932	[2]2,616,700	[1]1,308,000

[1]Estimate by Bureau of Mines.
[2]Includes some molybdenum temporarily stocked at mines.

Output of molybdenite concentrates from the Knaben mine in Norway was reported as 330 metric tons, compared with 223 tons in 1931. A new rope tramway (capacity 800 tons of ore per 16 hours) between the mine and mill has been completed. The mine was reported to be operating at capacity at the beginning of 1933.

Two American mines (at Climax, Lake County, Colorado, and near Questa, Taos County, New Mexico) and a mine in Norway (at Knaben, east of Stavanger) produce all but two or three per cent. of the world's molybdenum. The Santo Nino mine (at Patagonia, Santa Cruz County, Arizona) has furnished a small quantity of high-grade ore during recent years. The International Molybdenum Co., which has been developing a property at Porthill, Boundary County, Idaho, reported the production of 100 tons of ore in 1932. Development was under way at properties near Miami, Gila County, Arizona, and near Goodsprings, Clark County, Nevada. Increased activity was reported in Australia and a new source of production is announced in French Morocco.

The above information on molybdenum is furnished by the United States Bureau of Mines.



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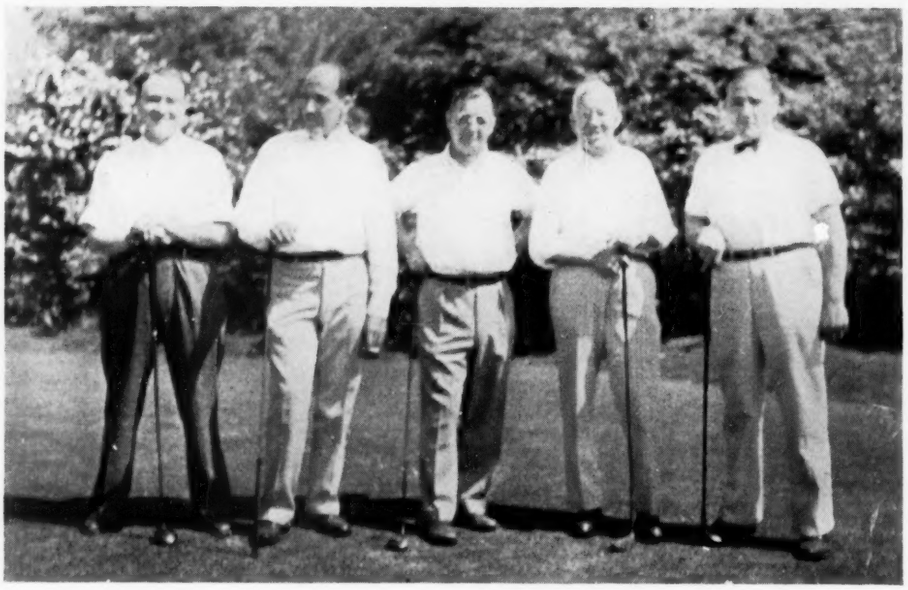
"The old master at work." Miller Fargo, of Calco, sighting a putt down the pipe-stem line.



The fivesome has "no rights." Don Williams (Dow); Fred Neuberg (Warner); Russ Curtis (Dow); "Doc" Dorland (Dow); Lou Neuberg (Warner). Photo by Harry Mabey. To the left, Harry Derby (Cyanamid) and Eli Winkler (Columbia) watching their competitors tee-off.

Below: The tow near Eads Bridge, leaving St. Louis.

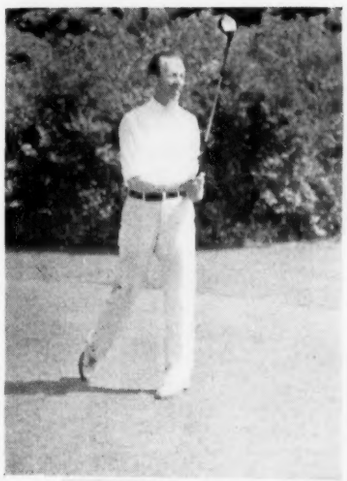
Above: An 18 foot sign on the side of the barge called attention to the Monsanto cargo.

Monsanto Chemicals on first tow, St. Louis to Chicago by Waterway. Inaugrated only recently the first expedition consisted of five carloads of chemicals totaling approximately ninety-five tons. Courtesy Monsanto.

NEWS REEL

of Our Chemical Activities

Willard H. Dow (Dow Chemical) and Dr. Jean F. Piccard, who will make stratosphere explorations this summer to study the cosmic ray, examine the dowmetal gondola in which Dr. Piccard and his navigator will be sealed. Through the use of dowmetal, a saving of about one hundred pounds in weight was made which the Professor believes will allow the craft to go a mile higher than the previous attempt.



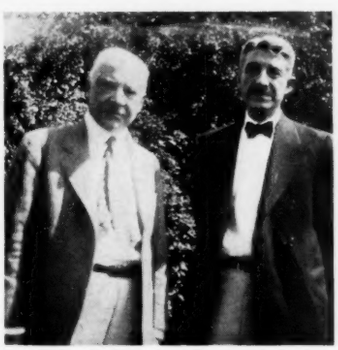
"Lee" Doan transplanted from Midland, Michigan, to Shawnee on the Delaware.

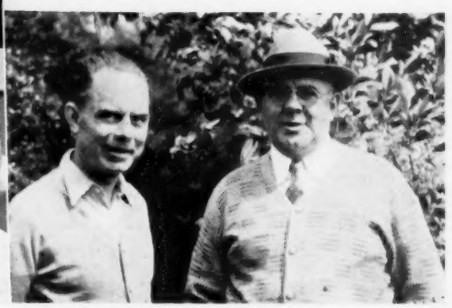
Ned Brundage (Michigan Alkali) is off the wood this season.

Fred Neuberg (Warner) wistfully watching the distant green.

Two alkali moguls at play above. E. M. Allen (Mathieson) and Hugh Galt (Columbia). Below, left to right, Robinson (Du Pont); Ernest Klipstein (E. C. Klipstein); Fritz Howes (American Dyestuff Reporter); and Elvin Killheffer (Du Pont).

Wasserscheid and Russe—they represent Mallinckrodt.





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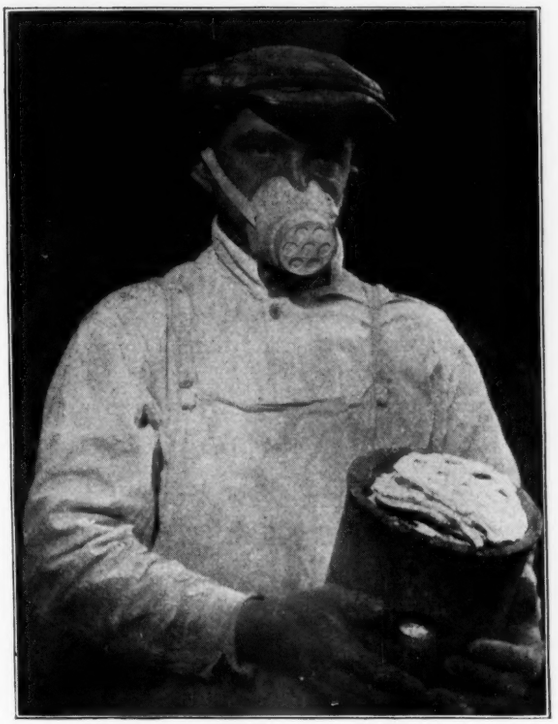


Lead Pigments

An economic survey of current market conditions contrasted with conditions prevailing for the past three years.

By Walter J. Murphy

WHILE the increase of 20 per cent. in the lead metal price is small in comparison to the 57 per cent. rise in copper and the 60 per cent. rise in tin, it has been sufficient to change the market picture considerably. State of the metal market, construction, volume of repair and maintenance work, automobile and storage battery production, are four factors largely responsible for market conditions in lead pigments. Accurate statistics are readily available for the first, second and fourth factors; the third is not quite so easily gauged.

In common with all of the so-called base metals, lead declined in price from the peak reached in 1929 to extremely depressed levels prevailing throughout most of 1932. However, the decline from a high of 7¾ cents to 3 cents was not as proportionally great as the drop in some of the other base metals, copper for example. In several ways the statistical position of lead has been for the past three years better than many of the comparable metals. While conditions have been admittedly bad they have not been nearly as chaotic as in copper or tin.

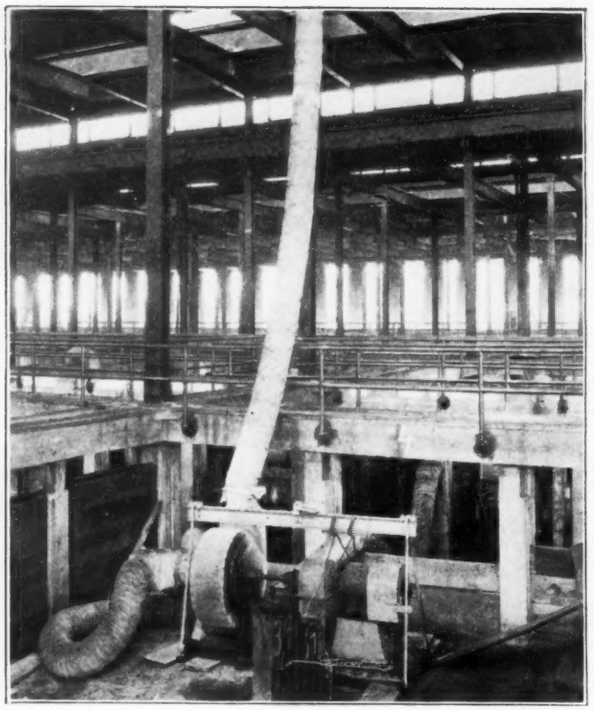
In common with other metals serious attempts were made throughout the years 1930-32 to curtail production—to adjust volume to consumption. That these attempts were not entirely successful is evident from the fact that at the end of May, 1933, United States lead stocks amounted to 284,382 tons, as against a carryover of only 103,247 tons at the end of 1930 and less than 50,000 tons at the end of 1929, despite the fact that production declined from about 51,000 tons a month in 1930 to about 20,000 tons a month for the first four months of 1933. In 1930 production of refined primary lead declined 17 per cent. from 1929 figures; in 1931 production declined 31 per cent. below 1930 and was the smallest on record since 1908. In 1932 the decline approximated 28 per cent. below 1931. Still surpluses continued to accumulate. There could be and was but one result—a weak metal price, and a gradual lowering of the price level for the various lead salts.

The tie-up between lead pigments and the metal is much closer than is the case with copper chemicals and the red metal. In 1930, for example, approximately 190,000 tons of pig lead were consumed in the manufacture of lead pigments out of a total of 772,033 tons produced. Copper chemicals, of course, do not consume anything like the same proportion of the metallic copper output.

Building operations in 37 states east of the Rocky Mountains, as reported by the F. W. Dodge Corporation, totalled in each of the four years, 1929-1932, as follows:

1929	$5,750,790,500
1930	4,523,144,600
1931	3,092,849,500
1932	1,351,158,700

In the first four months of 1933 the total reached $252,599,800, indicating a final figure for this year (providing of course that the rate of operations continued unchanged) of a mere $757,799,400! By the end of the first four months of the current year the decline from 1932 reached $155,183,700. The April figure of $56,573,000 compares very unfavorably with $121,704,800 for the same month a year ago—a decline of 53½ per cent. Fortunately the immediate outlook now is for higher building totals over the balance of 1933. In May the total for 37 states



*Photograph shows machine used to suck away white lead dust when stripping a stack. Health problems are now not only thoroughly known but effective methods of offsetting the hazardous nature of lead pigment manufacturing have been devised.**

reached $77,171,700, an increase of 36 per cent. over April. While the 1933 May total figure was substantially below May, 1932, it is encouraging to note that residential and public utility awards were larger this year. Further, it is reasonable to assume that with plans in Washington now passed and ready for a huge public works program that immediate stimulus will be given to this division of building.

If 1929 is compared with 1932 it is quite apparent that building amounted to less than one-quarter of the volume of the boom year. If the first four months are taken as indicative of the trend for 1933, operations will total less than one-fifth the 1929 volume. Leading construction authorities, however, look for improvement over the balance of 1933 and the more optimistic look for an increase that would nearly approximate the 1932 monthly level.

No matter how favorable the future may now appear it is certain that few of our major industries have felt the blow of depression to as great an extent as did building. Small wonder then that the sale of chemicals with large percentage consumption in construction should show a sharp decline in tonnage and, in a great many instances, much lower price levels.

The lead pigments—white lead and basic lead sulfate are typical examples in this group. In both, the consumption employed in manufacture of paint largely overshadows the amount employed in all other uses. With red lead and litharge, the greatest consumption is in the storage battery field; in orange mineral manufacture of color pigments takes first place. In 1929 out of a total of 295,460 tons of all five lead pigments sold 161,816 tons, or more than half, were consumed in paint manufacture. It is realized, of course, that construction figures tell only part of the story; that a large part of the paint consumption is employed in maintenance for which there are no accurate figures. If one but looks around, however, it is quite apparent that in the past three years there has been a tremendous let-down in painting. Our buildings, our plants, and our homes are in need of new surface protection. The back-log is tremendous, but, apparently, it is going to require a period of better profits (or some profits!) for industrial concerns, work for the unemployed, and higher wages for the householder who fortunately is employed, to loosen up a wide gap in the buying dam. But at least such paint production figures as do exist, as well as statements by leading paint manufacturing executives, indicate that improvement is not only definitely under way, but in the past 30 days paint sales have forged ahead at an accelerated pace that is most encouraging, according to reports. In March (preliminary) sales of paint and varnish (no separate figures available) totaled $2,480,590, as against $2,439,732 for February, and $2,386,977 for January. The figure for March, however, was below the average for the last seven months of 1932, which was $2,935,888. It is felt, however, that April and May paint statistics will "paint" a still better picture. Still, leading authorities in the lead industry reported when interviewed, and statistics bear out such statements, that the tonnage of lead consumed in the manufacture of lead pigments largely used for paints stood up better than the consumption of metallic lead in other industries. This can but lead to one conclusion and that is that maintenance has not been neglected to the same degree that we have curtailed building. Therefore our building figures are indicative of lead pigment consumption only up to a certain degree.

Next to consumption in paint manufacture, the largest single use of lead pigments is in the manufacture of storage batteries, 21 per cent. of the total in 1929. Red lead, basic lead sulfate and litharge are the three pigments used. The trend seems to be away from employment of red lead and basic lead sulfate in favor of litharge. From a comparison of the data given below it was found that the total decline in tonnage of all lead pigments used in storage battery manufacture between the years 1929 and 1931 amounted to 29 per cent.; the decline in production of automobiles and commercial vehicles amounted to 55 per cent.; and the decline in production of storage batteries declined 27 per cent. It is evident that the sale of batteries for replacement stood up well in the depression.

Year	*Red Lead*	*Basic Lead Sulfate*	*Litharge*	*Total Tonnage*	*Production* Auto. & Trucks*	*Storage Battery† Production*
1929	25,689 tons	2,327 tons	37,160 tons	65,176 tons	4,753,808	16,048,716
1930	18,998		33,173	52,171		
1931	13,700	697	31,615	46,012	2,149,715*	11,870,561*

†Census of Manufactures.
*Preliminary figures, Census of Manufactures.

*Photographs, courtesy National Lead Co.

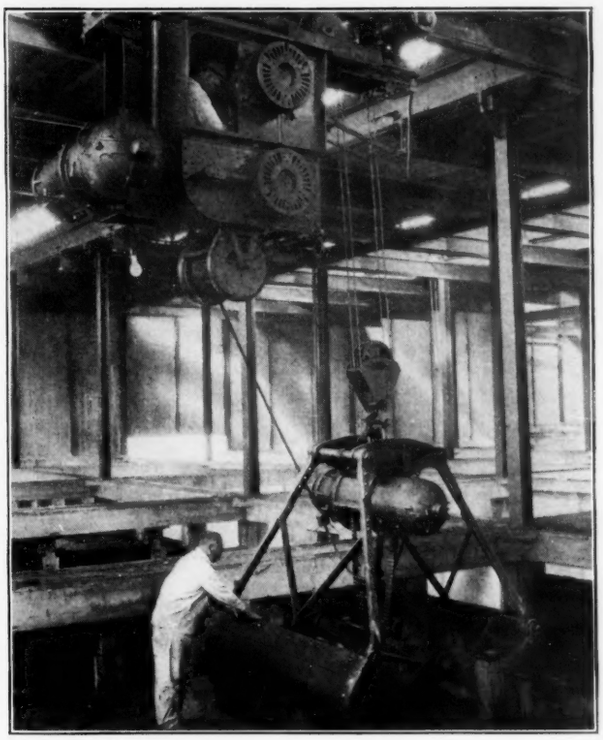
Executives interviewed, however, are unanimous in their insistence that the sale of lead pigments has not been satisfactory. Decreases in sales in 1930 in comparison with 1931 were as follows: orange mineral, 47 per cent.; basic lead sulfate 31 per cent.; white lead (dry and in oil) 31 per cent.; red lead, 23 per cent; and litharge 17 per cent. In 1931 the comparisons with 1930 were as follows: orange mineral, 21 per cent.; basic lead sulfate, 16 per cent.; white lead (dry and in oil) each 5 per cent.; red lead, 22 per cent.; and litharge, 12 per cent. The downward trend continued through 1932. Compared with 1931, dry white lead, declined 35 per cent.; white lead in oil, 30 per cent.; basic lead sulfate, 35 per cent.; red lead, 27 per cent.; orange mineral 25 per cent.; and litharge, 9 per cent.

Lumping the sales of white lead (dry and in oil), red lead, orange mineral, basic lead sulfate, and litharge together, the totals for 1929, 1930, and 1931 were as follows:

1929	295,460 tons	
1930	219,542 "	26 per cent. decline from 1929
1931	197,079 "	10 per cent. decline from 1930, and 33 per cent. decline from 1929.
1932	152,119 "	49 per cent. decline from 1929.

Aside from the decline in consumption and the drop in prices, little in the way of new developments in the lead pigments field has taken place in the last few years. Outstanding, of course, over a long period has been the struggle between white lead and other pigments for the favor of the paint trade. According to statistics contained in the United States Department of Commerce's 1931 report on lead and zinc pigments, written by E. W. Pehrson, sales of white lead in oil decreased from 153,000 tons in 1922 to 70,000 tons in 1930, while during the same period the combined sales of zinc oxide and lithopone increased from 212,000 tons to 283,000 tons. Drawing a conclusion from these figures the report states: "As three-fourths of the lithopone and about one-third of the zinc oxide produced in the United States are used in the manufacture of paints, these figures indicate the marked degree to which the zinc pigments have invaded the paint industry at the expense of white lead. This trend, however, appears to have been reversed in 1931, as sales of white lead to the paint industry increased slightly, whereas the consumption of lithopone on paint decreased over five per cent. and the total sales of zinc oxide decreased 20 per cent." It is strongly suspected that this is largely a question of relative prices—at least this factor has a lot to do with the matter, aside from the purely technical consideration.

Growth in the use of neon and other rare-gas illuminating and advertising signs has increased the consumption of lead pigments (a heavily leaded glass is necessary) and the introduction of tetra-ethyl lead gas has increased consumption of litharge slightly, but the amount compared to the total production or sales is rather small. In this connection it is of more than passing interest to note how different the introduction of anti-knock compound in gasoline affected the bromine field. There production was entirely insufficient and the tonnage required suddenly grew from about 500 tons annually to nearly 5,000 tons.



A mechanical scoop beginning to take off the top layer of tan bark in a stack. Most of the improvements in lead pigments' manufacture in the last few years have been mechanical rather than chemical.

In connection with the decline in the volume of lead pigments in the paint field in the depression it is worth mentioning that in previous periods of unemployment the sale of paints had increased. Some paint producers expected a somewhat similar condition to arise in 1930 and 1931 but were disappointed. They based their hopes on the fact that in 1921 the sale of white lead in oil increased 28 per cent. Quite likely the explanation may be found in one or more of the following; the 1920 depression was quite short-lived; it did not affect as many men who would be likely to paint their own homes by their own labor; the exceptionally high wages paid during the war for skilled and unskilled labor left workingmen with sizable bank balances; home painting had been seriously neglected during the war due to shortage of materials and labor.

Turning from the commercial aspects to the technical or manufacturing viewpoint for a moment, detailed questioning of a leading lead pigment technologist of this country indicated that little, if any changes, have been made in the basic production methods employed for the manufacture of the lead pigments in the past few years. Here and there refinements in production methods have been made, of

course, largely of a mechanical, rather than a chemical nature.

A glance at the price statistics in table 3 shows that the prices of the various lead pigments have not declined in the same ratio as the price of the metal. In 1931 the average value per ton of lead pigments was only 11 per cent. below the average in 1930, whereas the average quoted price of lead (New York) declined 23 per cent. This trend continued through most of 1932. In the latter part, prices of the metal and the pigments stiffened slightly. In the first two months of the current year prices again sagged in response to the generally very depressed state of business culminating in the bank moratorium and the abandonment of the gold standard. The present improvement has, of course, been reflected in rising metal prices and firmer prices for the pigments. The immediate outlook seems to be for further advances.

TABLE I

SALES OF LEAD PIGMENTS BY USES*

	1929 Short Tons	*1930* Short Tons	*1931* Short Tons	*1932* Short Tons
White Lead (dry and in oil)				
Paints	136,526	91,563	91,832	63,399
Ceramics	4,246	3,366	2,848	1,761
Other	6,259	7,211	2,688	1,514
	147,031	102,140	97,368	66,674
Red lead				
Storage batteries	25,689	18,998	13,700	10,655
Paints	11,855	10,906	9,256	6,389
Ceramics	903	835	811	467
Other	4,574	2,202	2,086	1,369
	43,021	32,941	25,853	18,880
Orange mineral				
Color pigments	487	188	114	108
Ink manufacture	151	88	119	58
Other	40	80	49	46
	678	356	282	212
Basic lead sulfate.				
Paints	13,435	10,632	8,311	5,689
Storage batteries	2,327	(1)	697	195
Rubber	655	422	173	77
Other	397	473	505	296
	16,814	11,527	9,686	6,257
Litharge				
Storage batteries	37,160	33,173	31,605	29,365
Oil refining	13,615	12,028	7,508	11,735
Ceramics	8,663	4,089	7,351	4,793
Chrome pigments	8,112	3,286	4,124	2,963
Rubber	6,651	4,736	3,582	2,591
Varnish	3,124	698	3,032	1,921
Linoleum	322	388	641	1,360
Other	10,269	14,180	208	169
			5,839	3,199
	87,916	72,578	63,890	58,096

1Not specified for 1930. Included under "Other."

The stock of 284,382 tons of metal on hand as the month of May closed, while excessive at the moment and equal to over 11 months shipments based on the rate for the first four months of 1933, is only about a four or five months supply if business should return within a reasonable time to 1930 levels. Even so, the statistical position of lead is much better than copper, yet the recovery in red metal has been outstanding. Recent figures show that at the end of 1932 the United States supply of copper on hand totaled 1,254,058,954 pounds, while 1932 withdrawals totalled only 519, 202,768 pounds, or more than two years supply based on 1932 consumption. Because of the serious loss brought about in the first three months of this year by the unusually upset conditions attending the bank moratorium paint producers and manufacturers of lead pigments will feel quite satisfied if the 1933 total reaches the 1932 figure. With far-reaching economies, instituted when the bottom fell out of profits in lead pigments and paints in 1930 and 1931, leading companies in the field stand to show better earnings due to increased sales, better margin of profits on those sales, and enhancement of inventory stocks, due to present and possible future advances in lead and lead pigments.

In the automotive (storage battery field) the immediate outlook is even more promising. Production after dwindling almost to a standstill in February and March (bank holiday period) has forged ahead at a rapid rate and activity in May in the Detroit and adjacent automobile centers was very satisfactory. Output reached 172,883 vehicles, an increase of 23 per cent. over April and of 51 per cent. over May of last year. This means better business for the battery people.

And what of the future? While the outlook is for still higher levels the whole price structure rests on four unknowns: 1. Is the present upswing the real thing at last? Probably so; 2. Outcome of the London Economic Conference; 3. Effect on prices of the operation of the Industry Control Bill; 4. Possibility of further inflationary measures.

TABLE II*

LEAD AND ZINC PIGMENTS AND ZINC SALTS SOLD BY DOMESTIC MANUFACTURERS IN THE UNITED STATES, 1929-30

	1929			*1930*			*1931*			*1932*		
	Short tons	*Value Total*	*Per ton*	*Short tons*	*Value Total*	*Per ton*	*Short tons*	*Value Total*	*Per ton*	*Short tons*	*Value Total*	*Per ton*
Basic lead sulfate or sublimed lead:												
White	15,580	$2,274,917	$146	10,308	$1,321,339	$128	8,790	$ 995,685	$113	5,708	$ 534,369	$ 94
Blue	1,234	195,849	159	1,219	130,017	107	896	90,755	101	549	34,125	62
Red lead	43,021	7,586,543	176	32,941	5,066,297	154	25,853	3,325,875	129	18,880	2,101,860	111
Orange mineral	678	165,039	243	356	76,655	215	282	55,254	196	212	37,691	178
Litharge	87,916	13,807,087	157	72,578	9,713,765	134	63,890	6,933,241	109	58,096	5,155,555	89
White lead:												
Dry	42,159	6,821,200	162	32,548	4,572,648	140	30,922	3,824,813	124	19,946	2,329,876	117
In oil	104,872	23,679,875	226	69,592	15,505,196	223	66,446	13,902,787	209	46,728	8,939,422	191
Zinc oxide	160,611	20,516,246	128	119,142	14,896,883	125	95,700	11,997,996	125	72,250	7,956,697	110
Leaded zinc oxide	27,149	3,224,544	119	17,279	2,072,197	120	18,577	2,140,864	115	14,305	1,296,076	91
Lithopone	206,315	19,773,864	96	164,065	15,897,683	97	151,850	12,999,590	86	121,667	10,176,856	84
Zinc chloride, 50° Baume	†47,295	1,608,475	34	29,043	1,247,385	43	34,885	1,417,010	41	23,524	1,033,255	44
Zinc sulfate	†7,454	333,837	45	6,249	276,728	44	5,290	199,482	38	4,252	138,476	33

†Revised.

TABLE III

LEAD PRICES COMPARED WITH LEAD PIGMENT PRICES, 1929-1933

Product	*1929* Low	*1929* High	*1930* Low	*1930* High	*1931* Low	*1931* High	*1932* Low	*1932* High	*Present*†	*1933* Low	*1933* High
Lead c. l. N. Y., per 100 lbs.	6.10	7.75	5.10	6.25	3.80	4.80	2.70	3.75	4.30	3.00	3.50
Litharge, 500 lb. bbls., per lb.	.08¾	—.10¼	.07¾	—.08¾	.05¾	.07¾	.05½	.07	.06¾	.05½	.06
White Lead, 500 lb. bbls. per lb.	.08¼	—.09	.07¼	—.08¼	.06½	.07¼	.06	.07	.06¾	.05½	.06
Lead Sulfate, 500 lb. bbls., per lb.	.07¾	—.08½	.06¾	— .7¾	.06	.06¾	.05½	.06	.06	.05½	.06
Red Lead, 500 lb. bbls., per lb.	.09¾	—.11¾	.08¾	—.09¾	.06¾	.08¾	.06¼	.07	.09¾	.06½	.07
Orange Mineral, 500 lb. bbls., per lb.	.11¾	.13¼	.10¾	—.11¾	.09½	.10¾	.09	.10¾	.10¾	.09	.09½

†Prices, July 6.
*U. S. Commerce Dept. Statistic

Economy in the Small Plant

By D. W. Beesley F. I. C.

ONE may quite fairly regard a chemical works as being a series of laboratory operations on a large scale, and principles applicable in the laboratory are frequently of equal importance in the works. Moreover, the tendency is always present for the technical staff to become the connecting link between the works and office, departments which rarely come into direct contact.

"Scotch Management" is at a premium in chemical operations, and the technical staff—quite aside from research on processes—is able to do quite a bit in plugging the little leaks that make losses, as is pointed out here in an article abstracted from a series Mr. Beesley is writing for "The Industrial Chemist" (London).

Bearing in mind that this treatise concerns works varying from 40 to 400 employees, it will become apparent that the question of the appointment and work of the technical staff must be handled in a fairly flexible way. We shall first deal briefly with the question of a research staff. While some of the works we are considering may employ one, two or more research chemists, it is extremely probable that the majority do not feel justified in, or appreciate the necessity of employing even one. This doubtless will appear a hopeless policy to many, and it cannot be doubted that once all idea of research is abandoned, the likelihood of expansion has ceased, and stagnation must ensue. Yet one must realize that many of the smaller works cannot afford any research staff, and, in certain cases even, do not require any. Thus, even a very small works manufacturing some complex drug may offer scope to a capable worker, but where one is dealing with a similarly sized firm which has been manufacturing zinc chloride for fifty years, and whose proprietor is stolidly determined to go on manufacturing zinc chloride by existing plant for another fifty years, one is not inclined to press the point unduly. These, however, are extreme cases, and few works exist where a research worker will not prove remunerative.

Even so, cases must arise where for various reasons the engagement of such is impossible. In this contingency one of two things may be feasible. The chief chemist may have time to carry out the shorter investigations, and if this be not the case, arrangements can be made for them and any exceptional problems to be dealt with by an outside firm of qualified chemists. We make no apology for leaving here the question of the research worker, as this book is mainly designed to indicate how the best economical return may be obtained from an established concern with reasonable rapidity, whereas the fruits of a research worker are to a great extent in the lap of the gods.

The chief chemist may have one or more qualified chemists to assist him, together with several chemical assistants, this depending upon the size and wealth of the firm, and the nature of its undertakings. Before considering how he may employ them to the best advantage, let us detail a few fundamental facts.

The profits a concern can hope to make depend on:—

(1) The price paid for the raw materials and obtained for the manufactured products.

(2) The efficiency of each plant working, *i. e.*, the ratio of the weight of the finished product obtained to that theoretically obtainable.

(3) The nearness of the tonnage produced on each plant to the tonnage obtainable by good working.

(4) Similarly, the nearness of the gross tonnage actually produced on all plants to the gross tonnage possible. (No. 3 affects the "direct labor" charge. No. 4 affects "proportionate labor" charge—these are dealt with in a later section).

(5) The cost of labor employed in attaining this efficiency and output.

(6) The cost of power (coal, electricity, air, water).

(7) Overhead charges.

Nos. 2 and 6 can only be kept at a satisfactory standard by an efficient use of the laboratory organization, and the same also applies to Nos. 3 and 4, when the output has not to be restricted owing

to small demand. It follows that there is a large amount of important routine work to be carried out, upon which the head chemist must keep a vigilant eye, and to the results of which he must never fail to give judicial consideration.

In the first place, there is the examination of the raw materials. These are sometimes purchased on a percentage basis as is done with iron pyrites, sulfur, etc. In this case the vendor also usually submits an analysis, the average being used for the fixing of price providing there is no undue discrepancy. While absolute accuracy must be the invariable aim, the undesirability of being perhaps 0.8 per cent. erroneously *above* the vendor's figure will be at once apparent. Other materials may be purchased in bulk, as, for example, salt and slack coal. If, as frequently happens here, an undue moisture content is shown to be present, a credit is generally obtainable to compensate for the loss of a corresponding weight of the raw material. Loss may be avoided by analysis of the raw materials in other directions than the buying price. For example, sodium nitrate to be used for vitriol making may ultimately take heavy toll of the lead work if it contains too high a percentage of chlorides, and quicklime containing an undue amount of carbonate will give a poor efficiency on a causticizing plant. This can be expanded indefinitely, so the advisability of examining raw materials before passing the invoices for same must be strongly pressed.

Plant Efficiency

Now consider a plant efficiency, the calculation of which is referred to later. The causes of loss of efficiency are many, and one pseudo-loss of efficiency has really been referred to in the last paragraph. For if we wrongly assume a raw material to be of greater purity than it is, we may be misled into thinking that our percentage production from it is unduly low, and waste time looking for a loss which has really not occurred. Thus, suppose from one ton of 97 per cent. salt cake we habitually make about 2.2 tons of Glauber's salt, and this last figure drops to 1.9. An examination of the salt cake used may show that its strength has diminished to about 83 per cent., and the trouble is at once explained. If, however, this is not detected, and the full price is paid as for 97 per cent. salt cake, this price will naturally be debited to the plant on the cost sheet, and a virtual undue loss of efficiency will appear there, although actually there has been no such loss in the plant itself.

Some actual losses in efficiency may be found to be in the sphere of the works department and are dealt with later, but many may be detected in the laboratory. There are frequently waste products which are thrown away, and unless these are examined regularly much good material may go to waste with them. Thus, sulfur may be left in the residue from a vitriol plant burner (if this be the case, we have an illustration in point where the chief chemist should at once get in touch with the yard manager), and "caustic sludge" too rich in caustic soda may be taken away from a causticizing plant, and similarly with most waste solids or liquids. There is a point in the purification of waste products, to go beyond which is not an economical proposition. Consider the last example cited. A caustic sludge containing one per cent. of caustic soda can be washed down to 0.1 per cent. or 0.01 per cent., but the greater the number of washings that are made, the greater will be the bulk, and the lower will be the strength, of the resultant liquor, which has to be brought ultimately to full strength by concentration. Therefore, it is necessary to make a rough estimate of the cost of the cleansing treatment, and of the quantity and value of the material which it is hoped to recover, before a certain amount of washing can be decided upon. One class of body only usually enters any process, viz., raw materials, but two classes generally emerge, viz., waste products and finished products. While it will be apparent to a great extent, even without having perused the foregoing paragraphs, that the laboratory examination of the first two is frequently a profitable operation, it is a point liable to be overlooked that the examination of the third, the finished product, may fulfil a very useful function other than satisfying oneself as to the purity of that product (which, of course, in itself, invariably justifies the examination). This is the case when a specific strength has been exceeded. If a powder is sold as containing 35 per cent. of a specific element, the chemist must see that it is not below standard, but he must equally remember that if it is, say, 38 per cent., that additional three per cent. is a toll on the maker, unless a "sliding" selling price has been arranged.

Gas Wastage

Losses of efficiency may also occur through wastage of gases, and for this reason it is always desirable to keep a watchful eye upon the various plant "exits" (*i.e.*, gas flues leading to the chimney). The extent to which the efficiency of a sulfuric acid plant can be damaged by a steadily bad "exit" is perhaps not fully realized, and the damage may be even greater in other cases. Big loses are liable to occur through an incomplete "condensation" of hydrochloric acid gas, and a plant dealing with this gas requires really careful scrutiny.

From the cost sheets, as discussed later, one will frequently find that the part cost of a product due to the fuel consumed is a very serious matter. Economical boiler working is so large a subject, and so much has been written concerning it, that in this small work one can only hope to touch upon a few of the most salient points, and several of these, following our method of division into departments, are treated later, as being in the yard manager's domain, but the expenditure may be considerably curtailed by the

activities of the head chemist, mainly in three ways, viz.:—

(1) By the analysis of the fuel.

(2) By the analysis of the exit gases.

(3) By the recording of the various temperatures, etc.

The analysis of the coal, etc., enables one to determine the percentage of available combustible matter present, and so to make an absolute comparison on a 100 per cent. basis of a number of variously priced fuels. The fuller the examination, the better the possibility of selecting the best of the series offered, and so one may determine the calorific power, the volatile content, etc., and for special purposes, sulfur, arsenic, etc. Even then, in this particular material, it is well for the chief chemist to ascertain from the yard manager the working qualities of the fuel, such as its initial degree of coarseness, liability to clinker and so forth.

The examination of the exit flue gases for their usual constituents is a great aid to cheap working (the chief chemist will realize that "continuous" tests are essential, "snap" tests being almost useless).

Other factors, which when determined and acted upon intelligently, are of great value, are the feedwater temperature, and the temperatures of the side flues and the chimney base, the speed of the exit gases, etc.

Laboratory Routine

The chief chemist has so far divided the routine work of the assistants into four big groups—raw materials, waste products, finished products and fuel. There is yet a fifth group, namely, the examination of the unfinished products at various successive stages of their manufacture. Here we have as many different requirements for as many different plants, so that it becomes almost impossible to particularize upon them. It must, therefore, suffice to say that this enables one to detect at which one of a series of "steps" a process is going wrong, and is so of infinite value to the manufacturer in maintaining efficiency throughout. Consider one possible case. Salt is decomposed in the usual Le Blanc process, the hydrochloric acid gas formed is decomposed by the Deacon method into its constituents, the chlorine is passed into milk of lime and forms the chlorate and chloride of calcium. This mixture is boiled to a certain strength and by the addition of potassium chloride, potassium chlorate is formed and separated from the calcium chloride by crystallization. It is then purified by recrystallization, and yields pure potassium chlorate. Now a certain quantity of salt should thus produce a certain quantity of chlorate, but possibly has produced much less. The chemist might here be enabled to say upon investigation that only 55 per cent. of the HCl gas is being decomposed at the Deacon plant. This is a case in point where the yard manager could be at a loss for possibly many days.

Before passing to an entirely different phase of the chief chemist's functions, a few remarks may not be remiss on methods to be adopted in all the foregoing routine work. A great deal of this work demands rapidity and approximately true results rather than great accuracy, and consequently by the adoption of suitable methods, much time may be saved and too large a staff obviated. As an example, if salt cake is one of the chemicals being produced, a large number of samples may require testing, especially if the market standard is not being maintained, and this would normally occupy a considerable time. Experience shows, however, that in freshly-made salt cake the total quantity of moisture, calcium sulfate, insoluble, etc., is always very near to 1.5 per cent. Consequently, to decide if a sample contains the desired 95 per cent. of sodium sulfate, it will be sufficient to determine volumetrically the percentage of chlorides expressed as salt, and the percentage of acid sulfate expressed as sulfuric acid, to the sum of which add 1.5, and deduct the result from 100.

Thus, if by volumetric estimations,

Sodium chloride = 1.3 per cent.

Sulfuric acid = 0.9 per cent.

Then Sodium sulfate = 100—(1.3 +0.9 +1.5)=96.3 per cent.

For a big consignment being sold this would not be sufficiently accurate, and an orthodox analysis would have to be made by one of the assistant chemists.

A further example may be taken in the case of coal, when two samples have to be compared for value when offered at different respective prices. This may be done by estimating the percentage of combustible matter and debiting the weight per ton so found with the full cost per ton of coal. For example, a coal offered at 24s. per ton is found to contain only 75 per cent. of combustible matter. Therefore, for 100 per cent. of combustible matter, this means a price of $100/75 \times 24/1 = 32$s. per ton. This would afford a common basis for comparison, but the combustible matter is really the whole of the coal less the ash and moisture, and is so obtained in the laboratory; hence, in this method no account is taken of the extra expenditure to be incurred in carting away the additional ash of a poor coal, or of the extra heat lost on account of the additional moisture in a damp coal. This defect can be approximately nullified by using for the calculation, instead of the actual percentage of combustible matter, a figure obtained by deducting from 100 the sum of 1.3 times the percentage of ash and 1.1 times the percentage of moisture, and which may be referred to as the Practical Combustible Matter Percentage. As with the previous method of rough and ready assumptions, this would not do for a fuel which was being bought for use in large quantities. Then an assistant must periodically make a full examination for the percentages of ash, moisture, volatile matter, fixed carbon and possibly sulfur, and also make a determination of the calorific power.

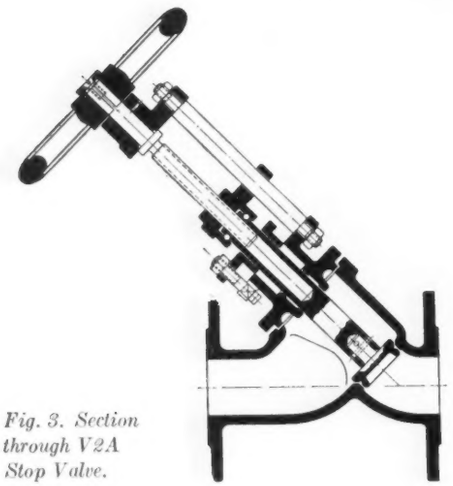


Fig. 3. Section through V2A Stop Valve.

Acid-Resisting Pumps

By C. H. S. Tupholme

IN EUROPE, as in America, the centrifugal pump is slowly but surely ousting its reciprocating counterpart in all branches of industry, and European designers of these pumps have lately given considerable attention to special metals to resist corrosion. Above all, efforts have been concentrated on the development of acid-resisting materials so important where finished products have to be particularly pure, without any trace of metal; for example, in the manufacture of rayon and pharmaceutical products.

Not only must such pumps resist chemical action; they must also be robust and stand up to almost continuous service. Accordingly, special attention had also to be paid to the conditions under which they work. Particularly careful attention has had to be devoted to the impeller and stuffing-box, since the liquids to be handled often contain mud or other gritty particles. With an improperly designed stuffing-box there is not only a danger of scale formation, which would have an abrasive effect on the shaft and

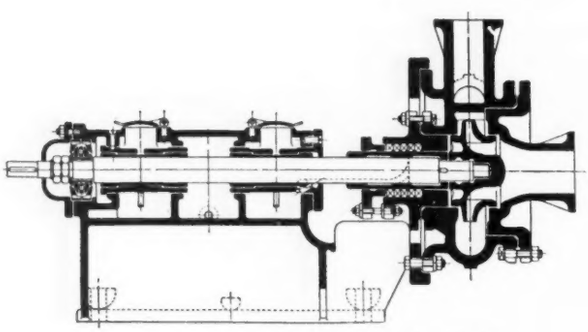


Figure 2. Section through Silicon-Iron Pump.

packing, provoking great wear in a very short time and rendering the stuffing-box very leaky; but it might also happen that the impeller would become so choked that the pump finally stopped delivering. There are consequently quite a number of points to be considered.

While, judging from the American technical press, American metallurgists are investigating very wide fields in their search for anti-corrosion metals, European workers have concentrated more on special stainless steels and silicon-iron alloys, which go under a variety of trade names.

The steels of the VA group, subdivided into V2A, V4A and V6A, contain from 17-21% chromium and

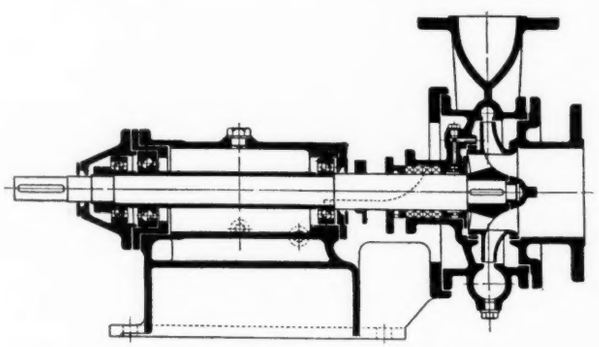


Figure 1. Section through V2A Pump.

from 6-11% nickel. The structure is an austenitic mixed crystal, in which the carbon, chromium and nickel are completely dissolved. Their excellent acid-resisting properties are explained by their tendency not to form combinations with other elements, i.e., the free valencies on their outer surfaces are soon saturated with oxygen. This forms a protecting layer of oxides, and the metal consequently behaves electro-chemically, insofar as it is liable to chemical action, like a precious metal. Absolutely perfectly treated, and consequently passive V2A and V4A steels, are in the neighborhood of silver in the voltaic series.

According to the Sulzer concern, which has taken a prominent part in the design of acid-resisting pumps, by the method of electronic diffraction it has been determined that the thickness of the protecting coating of such passive iron must be about two atoms. The same is the case for stainless steels; their property

of stainlessness depends to a large extent on this protecting layer remaining undamaged. Preservation of this layer is, however, assisted by the great tendency to remain passive. In the presence of oxygen the layer always endeavors to form again; an addition of molybdenum appears to strengthen this tendency. On the other hand VA steels should as far as possible be kept out of contact with other metals in order to prevent any electrolytic action.

Figure opposite shows how the tensile strength of V2A steel varies with the temperature. Further interesting physical particulars are:—melting point 1400 deg. C., specific gravity 7.86 to 7.9, specific heat 0.12. V2A steel is absolutely non-corrodible by nitric acid, or by organic acids, bases, lyes, salt solutions, etc. V4A extra steel has nearly the same tensile properties as V2A; when molybdenum is added to it, its resistance to corrosion is increased and the steel is particularly suitable for hot sulfurous acids, hot acetic acid, dilute formic acid, fruit acids, and other organic acids, particularly when they are under pressure. V6A steel with an addition of copper is adopted for special purposes in chemical industry.

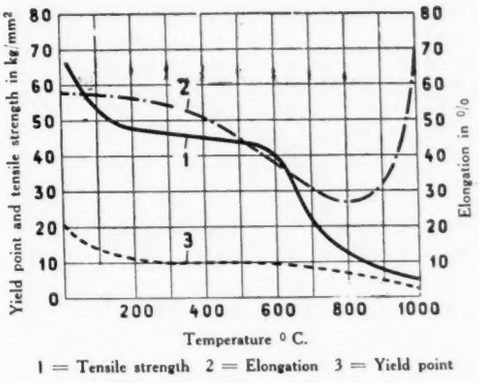
The resistance of the silicon-iron alloy to corrosion from acids increases with the proportion of silicon; but at the same time it also becomes more brittle. Because of its hardness, this material can only be machined by grinding, and it is sensitive to pressure and shocks. Pipes must therefore be connected to the pump without stressing it; and all parts require careful handling. However, if all instructions are carefully observed, the service given by such pumps is highly satisfactory, since they are absolutely non-corrodible by many liquids.

Numerous experiments have been carried out to determine the loss of weight per hour per square metre of surface of certain metals. The following rates of corrosion were taken as a scale of measurement for resistance to corrosion:—

Loss of weight per hour per square metre.

less than	0.1 gram	= absolutely resistant
0.1 to	1.0 gram	= sufficiently resistant
1.0 to	3.0 grams	= fairly resistant
3.0 to	10.0 grams	= little resistant
over	10.0 grams	= non-resistant

Fig. 1 is a section through an acid-resisting centrifugal pump made of V2A steel. The liquid enters the pump axially. The impeller is overhung on the shaft, which is borne in a pedestal on the driving side. This arrangement of the impeller makes it unnecessary to have any inner bearing lubricated by liquid in the suction branch. Also only one stuffing-box is necessary, and the impeller allows a larger quantity of liquid to pass than when the liquid enters on both sides. When dealing with liquid containing much fibrous matter, for example sulfite lyes, even an impeller of the usual type with the liquid entering on one side is also very liable to become choked. In such cases the so-called open impeller is adopted.



1 = Tensile strength 2 = Elongation 3 = Yield point

Mechanical Properties of V2A Special Steel.

Such impellers have proved excellent in paper mills and also for handling thick juices in sugar refineries.

The stuffing-box in this design of acid-resisting pumps is not under pressure from the liquid, and this is regarded as a great advantage, for the stuffing-box packing will no longer be fluid-tight if the gland has to be drawn up hard, in order to prevent the liquid issuing from it. The stuffing-box is relieved by means of an auxiliary pump which removes any liquid passing to the stuffing-box and discharges it into the suction chamber of the impeller. The packing has only to keep the pump from leaking when it is at rest; when the pump is running, the auxiliary pump keeps liquid circulating, and thus prevents air from being drawn in. The auxiliary equipment is designed in such a way that the packing could be dispensed with altogether if the liquid reached the pump at a pressure of 6½ to 10 ft. water gauge.

In practice such pumps are known as "acid-resisting pumps without stuffing-boxes." Experience has shown, however, that in most cases it is preferable to provide a relieved stuffing-box packing as well as the hydraulic packing. Its principal purpose is to prevent the liquid issuing from the pump when it is at rest; the stuffing-box should only be slightly tightened up. If a pump must work with suction, the sealing liquid is taken to the sealing liquid space of the stuffing-box from the delivery branch through a special passage. The auxiliary pump also takes up this liquid and sends it back to the suction side of the pump, thus relieving the packing.

The shaft is carried either in two ring-lubricated bearings or in radial ball bearings. The impeller has packing surfaces on both sides; they are of the same diameter, so that the impeller is therefore balanced hydraulically. Although no axial thrust worth mentioning can occur, a robust double-thrust ball bearing is arranged at the end of the shaft in order to take up any axial thrust which may arise. This thrust bearing is of particular importance when the packing rings become irregularly worn.

Such pumps are built in series for delivering up to 1550 gals. per min. against heads up to 260 ft. The pumps are driven either direct-coupled by electric motors or by belt. In the latter case it is preferable

to fit a flexible coupling between the pump and pulley shaft. The pump can then be changed for another and inspected without the drive having to be removed. The pulley shaft is carried in two robust ring-lubricated bearing pedestals. Because of the severe conditions under which the pumps have to run in chemical works, particularly since they are generally under the supervision of unskilled workers, the robust construction of the drive and of the pump itself, and also the ease with which one pump can be exchanged for another, are matters of no slight importance.

The valves (Fig. 3) are made of the same material as the pumps. They are designed in such a way that the resistance to flow is kept at the minimum.

As regards design, silicon-iron pumps do not differ greatly from VA pumps. Naturally, the mechanical properties of the material must be taken into consideration when designing individual parts. In order to comply with foundry requirements, the shape given to various parts has been kept as simple as possible. In addition to that, the number of surfaces requiring machining is everywhere kept as low as possible. Also in these pumps the liquid enters axially and the impeller is hydraulically balanced. There is also an auxiliary pump for relieving the stuffing-box. The steel shaft is protected by a silicon-iron bushing which reaches beyond the stuffing-box. Fig. 2 shows a section through a silicon-iron pump.

Special consideration must also be paid to any alterations in the resistance curves of the piping. Experience shows that the piping often becomes heavily encrusted in the course of time; the quantity delivered by the pump then decreases, if no proper allowance has been made to prevent it. This can be recognized most easily from a glance at the characteristic for the head. The total head is composed of the actual measured head, the resistance in the piping and the pressures or vacuums which may prevail.

Company Booklets

American Cyanamid, 511 5th ave., N. Y. City. July-Aug. issue of American Hortigraphs and Agronomic Review contains as usual a wealth of practical information and news items for the fertilizer user. Bul. 1.

Faure, Blattman & Co., Holland, House Bury st., London, E. C. 3. This annual review of the oils and fats markets with its complete data is now so well-known in international trade as to require only a simple statement of its completion. Bul. 2.

Industrial Chemical Sales, 230 Park ave., N. Y. City. A 40 page brochure on "Nuchar" activated carbon and its many diversified uses in industry. Bul. 3.

Mallinckrodt Chemical Wks., St. Louis, Mo. Inflationary measures and recovery have stimulated prices. Over 32 advances and nine declines makes it imperative to have the June price list handy. Bul. 4.

National Aniline & Chemical, 40 Rector st., N. Y. City. June "Dyestuffs" features an article "Impregnation of Woven Knitted Goods Against Moistening by Water" and a complete resume of 1933 Fall colors. Bul. 5.

Philadelphia Quartz, 121 S. 3rd st., Philadelphia, Pa. "Curing Modern Concrete Roads" is a 20 page bulletin covering development of curing with silicate from the first developments in 1918 to present day construction in all parts of the country. Bul. 6.

R. T. Vanderbilt, 230 Park ave., N. Y. City. Last issue of "The Vanderbilt News" (devoted to rubber matters and materials) is featured by a feature article "The Effect of Various Loading Materials in Vulcanized Rubber," of interest to every rubber technologist. Data accompanying are invaluable. Bul. 7.

Standard Silicate Co., Frick Bldg., Pittsburgh. "Cleaner Clothes (second edition) is an authoritative textbook on sodium metasilicate in the laundry. Bul. 8.

United Carbon, Charleston, W. Va. A beautifully prepared brochure, especially well illustrated, describing company's position in the carbon black and natural gas field. Bul. 9.

New Equipment Booklets

Aluminum Co. of America, Pittsburgh. "Combating Chemical Corrosion with Alcoa Aluminum" is a 43 page booklet that gives the salient chemical and physical properties of aluminum from the viewpoint of the chemical engineer. Essential on every engineer's "five-foot shelf." Bul. 10.

General Electric, Schenectady, N. Y. GEA-1761 gives data on CR 1061 motor starting switches for fractional-horsepower motors. Bul. 11.

General Electric also has released GEA-1755 giving data on CR 7505-KI Photoelectric Relay (measurement by a beam of light) Bul. 12.

General Electric also GEA-1746 describing glyptal-cloth insulated cable. Bul. 13.

International Metallizing Association, 214 Provost st., Jersey City, N. J. New booklet describes Spray Metallizing Process of metal coatings. Bul. 14.

International Nickel, 67 Wall st., N. Y. City. New wire cloth booklet describes how filtration problems have been solved in scores of different industries by Monel metal and nickel wire cloth. Bul. 15.

Linde Air Products, 30 E 42nd st., N. Y. City. "Oxy-Acetylene Tips" for June features a survey of correct procedure for welding chromium steels. Bul. 16.

Mundet Cork, 450 7th ave., N. Y. City. A new price list on cork covering for low temperature pipe lines together with various specifications. Bul. 17.

National Electric Heating, 154 Nassau st., N. Y. City. Bulletin 86 describes the NEHCO process for industrial heating by hot circulating oil for temperatures to 600° F., and bulletin 87 for industrial heating by hot vapors to 900° F. Bul. 18 and 19.

Pfaltz & Bauer, 300 Pearl st., N. Y. City. Catalog No. B1 new catalog in a proposed series of four which describe Sartorius analytical balances. New departures are numerous and include new air-damped balances with projection reader; new preliminary weighting balances; new system of analytical weights using 1-2-3-5 denominations in place of old type 1-2-2-2-5; new semi-micro balance weighing to 1/100 mg. Bul. 20.

Raymond Bros. Impact Pulverizer, 1315 N. Branch st., Chicago. Copying the "Century of Progress" idea company has issued new booklet of special interest to producers of powdered material. Back-cover contains a cordial invitation to visit plant while in Chicago. Bul. 21.

Chemical Markets,
25 Spruce Street,
New York City.

I would like to receive the following booklets specify by number, viz. Bul. 1; Bul. 6, etc......

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Jun

Alexander Zimmerman, Ventilation Engineer, Department of Health, Chicago, here reviews the engineering problems of protecting chemical plant employees. This article was abstracted from the Journal of the Western Society of Engineers.

Safety for the Chemical Plant Worker

PREVENTION of industrial poisoning involves two essential methods of procedure. The first concerns the method of preventing unhealthful and poisonous air conditions and resolves itself into an engineering problem of controlling the degree of contamination, while the second is concerned with the personal care and health of the worker, and is strictly a medical problem.

There is not only a fundamental physical and chemical difference between solids, liquids and gases, but there is even a more important physiological effect distinction, in that their mode of entrance is different. Solids and liquids usually enter the body by being swallowed. Sometimes fine particles, in the form of dust or fumes, are breathed in and reach the lungs, but the greater amount is caught in the saliva and swallowed, thus passing into the system by way of the digestive tract. Volatile substances, on the other hand are inhaled and enter the respiratory tract.

There are three portals of entry for industrial poisoning, namely, through the air, contact, and food contamination. Before discussing the harmful effects produced through these portals of entry, it is essential that the nature of the physiological reactions of hazardous chemicals be known.

From the respiration standpoint, gases and volatile substances have been classified into four groups as follows:

1. Asphyxiants.
   (a) Simple Asphyxiants.
   Physiological inert gases like hydrogen and nitrogen which, when breathed in high concentrations, act mechanically to exclude oxygen.
   (b) Chemical Asphyxiants.
   Substances which, when combining with the hemoglobin of the blood or with tissue, either prevent oxygen from reaching the tissue, or prevent the tissue from using it.
2. Irritants.
   Gases injurious to air passages and lungs, and which cause inflammation and irritation of the respiratory tract.
3. Volatile Drugs and Druglike Substances.
   Gases which do not affect the lungs but which exert a druglike action after being absorbed through the lungs into the blood.
   (This group includes volatile hydrocarbons, whose action is essentially anesthetic in nature, and organic nitro-compounds which alter and destroy the hemoglobin of the blood.)
4. Inorganic and Organo-metallic Substances.
   The volatile forms of poisonous elements and compounds which exert toxic action after absorption into the body. Each has its own physiological effect.

Table "A" is a chemical and physiological classification of elements and compounds occurring in industry in volatile forms. (Reference,—"Noxious Gases" by Henderson and Haggard.)

The most important mode of entrance for industrial poisoning is through air breathed in which carries not only toxic gases, but dust and fumes. As has been previously stated, dust and fumes that are breathed in, will in part reach the lungs, but very often the

TABLE A.

Table of Noxious Gases Listed According to Chemical Composition and Classification According to Their Action.

Name	Formula	Ordinary Condition	Boiling Point Degrees Centigrade	Nature of Physiological Action Classification
Inorganic Substances				
Elements				
Fluorine	F_2	Gas	— 187.0	
Chlorine	Cl_2	Gas	— 33.5	Group II
Bromine	Br_2	Fluid	63.0	Irritants
Iodine	I_2	Solid	148.0	
Ozone	O_3	Gas	— 119.0	
Nitrogen	N_2	Gas	— 195.0	
Helium	He	Gas	— 267.0	Group I
Hydrogen	H_2	Gas	— 253.0	Simple Asphyxiants
Mercury	Hg	Liquid	357.3	Group IV
Phosphorus	P_4	Solid	290.0	Inorganic and organometallic compounds
Acids, Bases and Oxides.				
Hydrochloric acid	HCl	Gas	— 83.0	
Hydrofluoric acid	HF	Gas	19.4	
Sulfuric acid	H_2SO_4	Liquid	338.0	Group II
Sulfur dioxide	SO_2	Gas	— 8.0	Irritants
Nitrogen dioxide	NO_2 and N_2O_4	Gas	26.0	
Ammonia	NH_3	Gas	— 33.5	
Nitrous oxide	N_2O	Gas	— 87.9	Simple Asphyxiant
Carbon dioxide	CO_2	Gas	— 79.0	Simple Asphyxiant Group I
Carbon monoxide	CO	Gas	— 190.0	Chemical Asphyxiant Asphyxiant.
Hydric Compounds of Non-Metallic Elements				
Hydrogen sulfide	H_2S	Gas	— 61.8	
Hydrogen arsenide	H_3As	Gas	— 55.0	Group IV
Hydrogen Phosphide	H_3P	Gas	— 85.0	Inorganic and Organometallic compounds
Salts				
Phosphorus trichloride	PCl_3	Liquid	76.0	
Phosphorus pentachloride	PCl_5	Liquid	160-165	Group II
Arsenic trichloride	$AsCl_3$	Liquid	130.2	Irritants

Name	Formula	Ordinary Condition	Boiling Point Degrees Centigrade	Nature of Physiological Action: Classification.
Organometallic Compounds				
Diethyl diarsine	$(C_2H_5)_2As_2$	Liquid	150.0	
Tetraethyl lead	$(C_2H_5)_4Pb$	Liquid	198.0	Group IV
Nickel carbonyl	$Ni(CO)_4$	Gas	43.0	Inorganic and organometallic compounds
Hydrocarbons of the Fatty Series				
Methane	CH_4	Gas	— 160.0	
Ethane	C_2H_6	Gas	— 85.4	
Propane	C_3H_8	Gas	— 37.0	Group III
Butane	C_4H_{10}	Gas	1.0	Volatile Drugs and Druglike
Pentane	C_5H_{12}	Liquid	37.0	Substances
Hexane	C_6H_{14}	Liquid	69.0	Lower members simple asphyxiants
Heptane	C_7H_{16}	Liquid	98.0	Higher members also irritants.
Octane	C_8H_{18}	Liquid	124.0	
Nonane	C_9H_{20}	Liquid	148.0	
Decane	$C_{10}H_{22}$	Liquid	168.0	
The low volatility and low solubility of the higher homologues of the series prevent their absorption in quantities sufficient to induce physiological action.				
Ethylene	C_2H_4	Gas	— 103.0	
Propylene	C_3H_6	Gas		
Butylene	C_4H_8	Gas	— 5.0	Group III
Amylene	C_5H_{10}	Liquid	35.0	Volatile Drugs and Druglike
Hexylene	C_6H_{12}	Liquid	70.0	Substances
Heptylene	C_7H_{14}	Liquid	100.0	Lower members of series also
Acetylene	C_2H_2	Gas		simple asphyxiants.
Hydrocarbons of the Aromatic Series				
Benzene	C_6H_6	Liquid	81.0)	
Toluene	C_7H_8	Liquid	111.0)	
Xylene	C_8H_{10}	Liquid	140.0)	
Alcohols				Group III
Methyl alcohol	CH_3OH	Liquid	66.0)	Volatile Drugs and Druglike
Ethyl alcohl	C_2H_5OH	Liquid	78.5)	Substances.
Propyl alcohol	C_3H_7OH	Liquid	97.5)	
Butyl alcohol	C_4H_9OH	Liquid	117.0)	
Amy alcohol	$C_5H_{11}OH$	Liquid	138.0)	

greatest amount is caught in the saliva and swallowed. The form of poisoning, however, differs according to whether the poison has reached the stomach or passes directly to the lungs.

Dust and fumes, which are really very fine suspensions of dust, produce various physiological effects which vary with the different materials. The term "pneumonoconiosis" has been applied to the various forms of lung diseases caused by inhalation of dust. Although the types of pulmonary lesions caused by dust varying with the different types of materials, the fibrosis or replacement of the elastic lung tissue by that of an unyielding scar tissue is the pathological process underlying all forms of lung disease.

The dust particles significant in considering the production of a fibrous reaction in the lungs range in size from 0.5 to two micro-millimeters in diameter.

Gibbs has made a physical classification of dust particles as follows:

Dusts—greater than 10 m-mm. in diameter.

Clouds—from 10 to 0.1 m-mm. in diameter.

Smokes—from 0.1 to 0.001 m-mm in diameter.

The quality as well as size of particles is equally as important, for there are non-irritant and irritant dusts.

The following is a physiological classification of dusts:

1. Poisonous (taken up by the liver after absorption through the lungs).

   Lead, mercury, arsenic, chromates and their various compounds.

2. Fibrosis Producing.

   Free silica, crystalline, silicon, dioxide, granite, quartz, sandstone, combined silicates, metallic dusts, and compounds which are non-poisonous.

3. Non-Fibrosis.

   Organic, such as cotton, jute, hemp, etc.

The second mode of entrance for industrial poison is contact or through the skin. There are a large number of compounds used in industry which fall into this class and which require the workers to use protective measures. The following list contains substances falling into this class and which are commonly encountered:

Nitrobenzene, aniline, trinitrotoluene, picric acid, phenol, nitronilines, diamines, mercury compounds, carbon disulfide, methyl alcohol, benzol, tetraethyl lead, caustic powders, cyanides, acids, etc.

The third mode of entrance through food contamination, although listed last in relative importance, must be considered seriously. This mode furnishes a means of direct ingestion through the mouth by conveying the poison to the mouth from smeared hands which serve to contaminate food or tobacco, or through some implement of work, such as a fine camel's hair point brush placed in the mouth to bring it to a point.

Accidental formation of poisonous gases in industry is a possible means of poisoning which is often unthought of. Under certain conditions occurring during a process, harmful gases may be formed which are

Name	Formula	Ordinary Condition	Boiling Point Degrees Centigrade	Nature of Physiological Action Classification.
Ethers				
Methyl ether	CH_3OCH_3	Gas	— 21.0)	
Ethyl ether	$C_2H_5OC_2H_5$	Liquid	35.0)	
Propyl ether	$C_3H_7OC_3H_7$	Liquid	86.0)	
Ketones				Group III (cont'd)
Dimethyl ketone (acetone)	$(CH_3)_2CO$	Liquid	65.5)	Volatile Drugs and Druglike
Methyl ethyl ketone	$CH_3COC_2H_5$	Liquid	81.0)	Substances.
Aldehydes				
Formaldehyde	CH_2O	Gas	— 21.0	
Acetaldehyde	C_2H_4O	Liquid	20.8	Group II
Propyladehyde	C_3H_6O	Liquid	49.0	Irritants, but also Volatile Drugs
Butaldehyde	C_4H_8O	Liquid	74.0	and Druglike Substances.
Acraldehyde (acrolein)	C_3H_4O	Liquid	52.0	
Halogen Derivatives of the Fatty Hydrocarbons.				
Methyl chloride	CH_3Cl	Gas	— 24.0	
Methyl bromide	CH_3Br	Gas	4.5	
Methyl Iodide	CH_3I	Liquid	44.0	
Ethyl chloride	C_2H_5Cl	Gas	12.5	
Ethyl bromide	C_2H_5Br	Liquid	39.0	
Ethyl iodide	C_2H_5I	Liquid	72.0	
Methylene dichloride	CH_2Cl_2	Liquid	41.0	Group III
Dichloroethylene	$C_2H_2Cl_2$	Liquid	55.0	Volatile Drugs and Druglike
Ethylene dichloride	$C_2H_4Cl_2$	Liquid	85.0	Substances.
Trichloromethane	$CHCl_3$	Liquid	61.2	
Tribromomethane	$CHBr_3$	Liquid	151.2	
Trichloroethylene	$CHClCCl_2$	Liquid	87.1	
Trichloroethane	$CHCl_2CH_2Cl$	Liquid	115.0	
Tetrachlorometrane	CCl_4	Liquid	76.7	
Perchloroethylene	C_2Cl_4	Liquid	119.0	
Tetrachloroethane	$CHCl_2CHCl_2$	Liquid	147.2	
Pentachloroethane	CCl_3CHCl_2	Liquid	161.7	

not normally encountered. Very often these gases are undetected until they have taken effect on the exposed men, and then sometimes the real cause of poisoning is unsuspected. The use of carbon tetrachloride (CC) as a fire extinguisher in an atmosphere poor in oxygen, often results in the formation of phosgene ($CO Cl_2$), a very poisonous gas. Carbon tetrachloride is used for cleaning metallic parts of grease and often this process is carried on while the parts are warm and in work spaces poorly ventilated. This is very conducive to the production of phosgene.

Name	Formula	Ordinary Condition	Boiling Point Degrees Centigrade	Nature of physiological Action: Classification.
Amines				
Methylamine	CH_3NH_2	Gas	6.0	
Dimethylamine	$(CH_3)_2NH$	Gas	8-9	
Trimethylamine	$(CH_3)_3N$	Gas	3.5	Group II
Ethylamine	$C_2H_5NH_2$	Gas	18.7	Irritants, also Volatile Drugs
Diethylamine	$(C_2H_5)_2NH$	Liquid	56.0	and Druglike Substances.
Triethylamine	$(C_2H_5)_3N$	Liquid	89.0	
Benzylamine	$C_6H_5CH_2NH_2$	Liquid	185.0	
Amido Compounds				
Aniline	$C_6H_5NH_2$	Liquid	183.0	
O-m toluidine	$C_6H_4CH_3NH_2$	Liquid	197.0	Group III
Methylaniline	$C_6H_5NHCH_3$	Liquid	191.0	Volatile Drugs and Druglike
Dimethylaniline	$C_6H_5N(CH_3)_2$	Liquid	192.0	Substances.
Pyridine and Turpentine				
Pyridine	C_5H_5N	Liquid	115.0	Group II
Turpentine	$C_{10}H_{16}$	Liquid	116.7	Irritants
Cyanogen Compounds				
Cyanogen	C_2N_2	Gas	34.4	
Cyanogen chloride	CNCl	Gas	15.5	
Hydrocyanic acid	HCN	Gas	26.0	
Acetonitrile	CH_3CN	Liquid	81.0	Group I
Propionitrile	C_2H_5CN	Liquid	97.0	Asphyxiants
Methyl isonitrile	CH_3NC	Liquid	58.0	
Ethyl isonitrile	C_2H_5NC	Liquid	82.0	
Benzonitrile	C_6H_5CN	Liquid	190.0	
Methyl mustard oil	CH_3NCS	Liquid	119.0	
Ethyl mustard oil	C_2H_5NCS	Liquid	133.0	Group II
Allyl mustard oil	C_3H_5NCS	Liquid	150.7	Irritants

Another unsuspecting poisonous gas is arsine ($As H_3$), which has a disagreeable garlic-like odor. The formation of arsine, or hydrogen arsenide, may take place in any number of processes where hydrochloric or sulfuric acids are used in contact with metals such as zinc, lead, antimony and iron containing arsenic as an impurity. Arsenic impurities in either of the acids also serve as dangerous sources contributing to the formation of arsine.

Protection along these lines lies mainly in the recognition of the possibility of the formation of such gases and vigilance to guard against it.

A very important means of reducing industrial poisoning is the substitution of non-hazardous for hazardous chemicals.

Lead paints have been the source of a large number of lead poisoning cases, and, as a result, substitutes for lead have been devised. The two most important substitutes for lead in paints are lithopone and titanium oxide.

The increasing use of lacquers and enamels has materially increased the number of benzol poisonings. Next to lead, benzol is the most important toxic substance used in coatings. A great amount of improvement has been made along the lines of finding benzol substitutes which are far less toxic. Toluol, xylol, and petroleum distillates are being substituted for benzol to such a degree that benzol is no longer used in many industries.

The nitrocellulose solvents chiefly used in the United States at present are normal butyl alcohol, amyl, ethyl and normal butyl acetates, and acetone. Among the new American solvents in use are ethyl oxybutyrate and the methyl ester of ethylene glycol, and ethylene glycol monoethyl ether. The added cost of using the more expensive non-hazardous for hazardous thinners and solvents is the thing which is materially affecting the substitution.

Name	Formula	Ordinary Condition	Boiling Point Degrees Centigrade	Nature of Physiological Action Classification.
Halogen Derivatives of the Aromatic Series				
Chlorobenzene	C_6H_5Cl	Liquid	132.0	
Bromobenzene	C_6H_5Br	Liquid	155.0	Group II
Chlorotoluene	C_7H_7Cl	Liquid	150-160	Irritants
Benzl chloride	$C_6H_5CH_2Cl$	Liquid	176.0	
Sulfur Derivatives of the Hydrocarbons				
Thiophene	C_4H_4S	Liquid	84.0	Group III
Carbon disulfide	CS_2	Liquid	46.2	Volatile Drugs and Druglike Substances.
Ethereal Salts of Organic Acids.				
Methyl formate	CH_3CO_2H	Liquid	32.3	
Methyl acetate	$CH_3CO_2CH_3$	Liquid	57.5	
Methyl butanate	$CH_3CO_2C_3H_7$	Liquid	102.2	
Ethyl formate	$C_2H_5CO_2H$	Liquid	54.4	Group III
Ethyl acetate	$C_2H_5CO_2CH_3$	Liquid	77.0	Volatile Drugs and Druglike
Ethyl butanate	$C_2H_5CO_2C_3H_7$	Liquid	119.0	Substances.
Propyl acetate (Iso)	$C_3H_7CO_2CH_3$	Liquid	35.8	
Butyl acetate (Iso)	$C_4H_9CO_2CH_3$	Liquid	116.3	
Amyl acetate	$C_5H_{11}CO_2CH_3$	Liquid	148.6	
Nitrates and Nitrites of the Hydrocarbons				
Methyl nitrate	CH_3NO_3	Liquid	66.0)	
Ethyl nitrate	$C_2H_5NO_3$	Liquid	87.0)	
Ethyl nitrite	$C_2H_5NO_2$	Gas	17.0)	
Propyl nitrite	$C_3H_7NO_2$	Liquid	)	
Butyl nitrite	$C_4H_9NO_2$	Liquid	)	
Amyl nitrite	$C_5H_{11}NO_2$	Liquid	99.0)	
			)	Group III
		Nitro Compounds	)	Volatile Drugs and Druglike
Nitromethane	CH_3NO_2	Liquid	100.0)	Substances.
Nitroethane	$C_2H_5NO_2$	Liquid	114.0)	
Nitrobenzene	$C_6H_5NO_2$	Liquid	205.0)	

A most important mode of preventing industrial poisonings is the prevention of the escape into workrooms of gases, fumes or dust from industrial processes. This method of prevention lies mainly along the lines of adequate and properly designed exhaust equipment. The harmful substance should be taken away from a point as close as possible to the original source. Consideration should also be given to the natural movement of the materials, for if they are lighter than air, they can be exhausted laterally or vertically away from the source,

but if, on the other hand, they are heavier than air, a downward exhaust system is most efficient. For example, if lead, carbon tetrachloride or other heavy fumes are encountered, the downward method is absolutely the only safe and efficient one. If an upward exhaust system is used, the harmful substances are carried up through the breathing zone of the workers and present a distinct hazard. The downward system may entail the use of an exhaust pulling from beneath a perforated bench top or make use of a slotted duct around the outer edge of the work table. This exhaust system is so designed as to cause a lateral movement of fumes across the table top into the duct work connected to an exhaust unit.

In instances where heavy solvents are used, as for example in the dry cleaning industry, floor-level exhaust systems are the best means for removing the harmful fumes which are heavy and tend to drop to the floor. As a rule naphtha and "Stoddards Solvent" have been used in this industry, but of late the use of non-flammable carbon tetrachloride has increased. Carbon tetrachloride has a molecular weight of 153.84 which is more than five times that of air. It has been found that workers continually exposed to as low a concentration, as one part carbon tetrachloride in 10,000 parts of air, experience harmful effects. In some instances the cleaning tumbler containing the solvent is connected to an exhaust system, which is turned on before the tumbler is opened up and unloaded. In this manner an appreciable amount of the volatile fumes are removed before the operator opens the tumbler.

Chromic Acid Hazards

The lateral exhaust method is being used extensively for removing fumes arising from plating processes, especially in chromium plating. Chromium plating carries with it what is usually referred to as chromic acid spray in the form of an outer coating around the gas bubbles.

Chromic acid, although not a systemic poison, produces serious effects on workers exposed. The harmful effects consist chiefly of skin irritation, ulcers of the skin and mucous membrane of the nose and throat and not uncommonly perforation of the nasal septum.

Natural ventilation cannot adequately remove the chromic acid spray and forced vertical exhaust ventilation through hoods is ineffective and undesirable due to its drawing the spray past the face of the operator working over the tank. Research has shown that continuous daily exposure of chromic acid concentrations greater than one milligram in 10 cubic meters of air is conducive to causing definite injury to the nasal tissues of the worker.

The most efficient method of removing chromic acid fumes is laterally across tanks having marginal ducts along the sides and ends of tank. These ducts should have a two-inch wide slot extending around the tank and for effective ventilation, a 2000-ft. per minute air velocity at the face of the slot is advisable. In addition, the duct should not be required to draw the air a lateral distance of more than 18 inches, and the level of the plating solution should be kept at least two inches below the top of the tank. This type of system is rapidly coming into use for all types of plating in hot cyanide solutions.

Cadmium plating has, in some instances, displaced chromium plating. Although the cadmium plating process presents no fume hazard the health hazard exists when the plating solution is made up, for the solid cadmium carbonate, when breathed in, may cause serious damage to the lungs. No matter how small the amount of cadmium salts taken into the lungs, it causes pathological changes, and there are, therefore, no lower limits of toxicity for cadmium salts.

Spray Booth Exhaust Systems

Air brush painting, is rapidly replacing the old brush method, and can be safely made use of if proper precautions are taken. Spraying is usually carried on in various designs of mechanical exhaust booths constructed of non-combustible material and open at one side only. To properly remove the mist, an adequate exhaust is required. In general, a velocity of 150 feet per minute or more, over the face of the opening is required to insure sufficient removal of the spray and fumes. Baffle or distributor plates on the inside of the booth are sometimes used for equalizing the air flow and preventing excess accumulation in exhaust ducts.

There are two types of spray booth exhaust systems in use; the direct exhaust, and the indirect exhaust. The direct exhaust employs an exhaust fan of either the propeller or blower type located either at the rear of booth or in the exhaust duct proper, so that in either case the fumes and spray must pass through the fan. In order to insure a proper exhaust, an adequate fresh air supply must be admitted to the room from the outside.

The indirect exhaust system, sometimes referred to as the injector type, is rapidly replacing the direct method. An exhaust fan of the blower type is located on the outside of the booth so that it discharges directly through an exhaust duct smaller in size than the larger main booth exhaust duct. This air movement in the main exhaust duct creates a partial vacuum in the duct and as a result, air rushes from the booth into this vacuum. No spray mist passes through the exhaust fan, and as a result there is no clogging or coating of the fan. This consequently lowers the fire hazard present when flammable spray vapors are removed from the possibility of being ignited from friction, electricity, etc. The air supply inlet for the fan may open direct to the room or may be connected to a duct leading to the outside. The latter connection is preferable if a large number of booths are in operation in the same room.

The injector nozzle, in some designs, discharges into a cylindrical exhaust duct, while in others it discharges into a tapered duct, expanding in cross section above the point of injection, and narrowing down below this point.

Several spray painting precautions should be taken by the worker even though an efficient booth is provided. Employes engaged in spray painting should:

(a) Not spray at right angles to a flat surface, so causing the spray to roll back.
(b) Not spray too large objects and thus get out of range of the exhaust.
(c) Not spray promiscuously about the room in testing the sprayer.

Exhaust systems for dust removal must be designed so as to be adapted to the individual dust producing machines. The type and physical characteristics of the material to be exhausted must also be considered. In general, the following requisites for efficient dust exhaust systems may be said to be the most important.

1. Hoods, ducts, fans and collectors of adequate size.
2. Adequate air volume and velocities for removing materials.
3. Properly designed exhaust hoods which will not interfere with the operation of machinery.
4. Dust and fire hazards should be minimized.
5. Equipment designed so as to work with the lowest possible power consumption.

The following velocities are commonly employed in dust removal systems for specific materials:

Cotton, dry wood shavings and sawdust, and similar light dusts ..... 2500-3000 ft. per min.
Wool, wet wood shavings, rags, waste, etc. ..... 3000-4000 ft. per min.
Lead dust, pulp chips, etc. ..... 4000-6000 ft. per min.

Suction pressures required at exhaust hoods for usual proportioned connections.

	Static Suction in Inches of Water
Grinding and buffing wheels	2
Wood working machinery	2–4
Flint Grinding	2
Lead dust and fumes	2–4
Felt	2–3
Heavy materials	3–5

There are some processes in which the escape of fumes, dust, etc., cannot be entirely prevented, or these harmful materials cannot be efficiently removed. It is, therefore, necessary that the workers individually wear efficient protective equipment, such as:

1. Mechanical respirators using mechanical filters.
2. Chemical respirators using chemical absorbents.
3. Gas masks using chemicals in cannisters.
4. Hose masks or positive pressure helmets securing a fresh air supply from an outside source.

When mechanical respirators are used, the air of the workroom is drawn through a suitable material which filters out the solid particles. This gives ample protection against the inhalation of solid particles for a short time only, due to the filters becoming clogged, and thereby increases the resistance to air flow.

Chemical respirators will also act as a mechanical filter for solids with a varying degree of efficiency. Due to the fact that the absorbent material must be renewed every few hours, chemical respirators are effective, in general, for short exposures only.

In gas masks, the air is drawn through chemicals contained in the cannisters, and it is very important to use the right kind of cannister and chemical for each particular case. The cannister must also be frequently replaced.

The hose mask or positive pressure helmet is the most satisfactory of all and is coming into greater use. The helmet or mask is made to fit over the wearer's face and fresh air is supplied through a hose from an outside source, in some instances a compressor line. A valve on the mask is so constructed as to permit the escape of air exhaled from the worker's lungs.

The prevention of skin contact with harmful chemicals is very important. When handling such dangerous chemicals, the worker should always wear gloves made of material capable of shielding the hands and arms in an efficient manner.

Very often workers labor in an atmosphere containing harmful dusts, such as arsenic, potassium or sodium cyanide, etc., which are soluble in sweat and which cause harmful irritant effects. In such cases the worker may be protected by smearing the exposed parts with a protective ointment, and lightly plugging the ears and nostrils with absorbent cotton. In addition, the men should be furnished with clean work clothes every day, and at the end of the day's work, the men should be required to take a shower bath.

A Modified LeBlanc Process

With sodium chloride, either solid or brine, as the raw material, the economic possibilities of the LeBlanc process are nowadays certainly rather remote; but when the prospective raw material is sodium sulfate, the position seems a little different. The availability of cheap and plentiful sodium sulfate cuts out the first stage of the LeBlanc process, with its necessity for recovering and disposing of the hydrochloric acid produced. Even with plentiful supplies of cheap natural sodium sulfate, it is doubtful whether the ordinary "black ash" process would pay today, even under most favorable circumstances. From some work carried out recently in the Tokyo Imperial Industrial Research Institute the problem of the conversion of sodium sulfate into sodium carbonate offers more hope of economic success when its solution is attempted from a somewhat different direction. The sodium sulfate is reduced to sulfide by coal or wood charcoal in the usual way, but the resultant mass is treated with carbon dioxide and steam, whereby sodium carbonate is formed and the whole of the sulfur of the sulfide liberated in the form of hydrogen sulfide. Japanese workers have found that although the reaction is such a heterogeneous one, it goes to completion ,within ten minutes within the temperature range of 300°-500° C. Apparently the carbon residues from the reduction act as an effective catalyst, for it has been established that active charcoal promotes very markedly the reaction between pure sodium sulfide, carbon dioxide, and steam. The recovery of the sulfur from the hydrogen sulfide presents, of course, no great technical difficulties. —*Chemical Trade Journal.*

New Products and Processes

New Colloidal Cleaner

The particular application of a new colloidal cleaning compound is to the plating industry and has been produced specifically to fill the need for an efficient and economical degreasing method. For the past six months it has been used exclusively in some of the largest cycle and motor works in the country. As a colloid it possesses exceptional wetting power. It is, therefore, able quickly and certainly to penetrate the layer of grease and wax with which the metal is coated and having done so to ensure the removal of the bulk of it. Its scrubbing action then operates and completes the removal of those tiny particles which, if not removed, play such havoc with the plating layer. It is used normally in a five per cent. w/w solution at boiling point and it has been found that the working life of the solution is longer than that of other compounds by reason of the fact that the grease, dirt, etc., is held in suspension in the liquor. Instant rinsing of the metal is obtained by reason of its colloidal nature so that no alkali remains behind to cause subsequent stripping.

Glue from Fish Offal

In England a process has been developed for the production of odorless and non-hygroscopic glues from fish skins comparing favorably with high-grade animal glue in adhesive power. Improved products from other fish offal, were also obtained, the improved production of fish glue being regarded as important to England because of its large fishing industry.

Asphalt-Rubber Composition

Mixtures of asphalt with rubber are superior to pure asphalt for road surfacing, insulation of concrete, impregnating, and similar purposes. It is difficult, however, to prepare a mixture which is stable and does not separate into the two components but it is claimed that the separation can be prevented if the mixture is made sufficiently viscous to offer a high resistance to the motion of the asphalt and rubber particles. Such viscous mixtures are obtained, according to the patent description, by using concentrated asphalt emulsions (for example, the so-called Flintkote containing about 65 per cent. bitumen) with a concentrated latex product (for instance, Revertex, containing 70 to 80 per cent. rubber). If a mixture with vulcanized rubber is desired, the Revertex can be replaced by Revultex, which is a vulcanized Revertex containing 60 to 70 per cent. rubber; or the Revertex can be vulcanized by addition of 2 to 3 per cent. sulfur, an accelerator, and an activator (usually zinc oxide), preferably together with a protecting colloid. Most of the commercial asphalt emulsions containing only 45 to 55 per cent. bitumen are not sufficiently viscous to produce a stable mixture with Revertex or similar concentrated latex products. When such asphalt emulsions are to be used, a substance has to be added to increase the viscosity of the mixture—for example, bentonite, casein, water glass, or a mixture of casein and water glass. The asphalt-rubber mixture produced according to this method, containing from 5 to 40 per cent. rubber calculated in proportion to the asphalt content, can be used for all purposes for which hot asphalt or asphalt emulsions are being employed.

Wood Carbonization

The Swedish Government has requested two chemists to report on a method of extracting benzine and other combustible products from wood by means of chemical decomposition. It is understood that the decomposition of the wood is made under a pressure of 100 atmospheres and at a temperature of 585° F. It is claimed that the wood yields about 40 per cent. of its weight in combustible liquid products. The practical economic value of the discovery is to be tested at an experimental factory.

Vulcanization Accelerators

For the purpose of identifying organic accelerators of rubber vulcanization the following is proposed:

About 0.05 gram of the purified sample to be tested is dissolved in 10 c.c. of benzene (or benzene-alcohol) in a test tube, and to this a few drops of a one per cent. solution of cobalt oleate in benzene added, the color reaction being carefully examined. Generally speaking, a purple, a yellowish green, a greenish blue, or a greyish violet coloration indicates the presence of guanidines (except orthotolylbiguanide), salts of dithioacids, mercaptobenzothiazole, or hexamethylenetetramine respectively.

If the sample gives negative results for the color reaction, then it is dissolved in benzene as before, oxidized with a smal amount of iodine (care must be taken not to add too much iodine), and a few drops of cobalt oleate reagent added. A characteristic greenish blue coloration indicates the original sample to be one of the thiourea accelerators. If the sample is found not to belong to the thioureas, it is dissolved in benzene again, reduced by the addition of zinc dust and dilute hydrochloric acid, and a few drops of cobalt oleate solution introduced as before. A greenish blue or a yellowish green coloration indicates that dibenzothiazole disulfide or tetramethylthiuram disulfide respectively are present.

Catalytic Oxidation of Ethylene

A process for the catalytic oxidation of ethylene with atmospheric oxygen has been worked out abroad. The most favorable results were obtained with a nine to elevenfold excess of air at a temperature of 400 ° C., using a gas mixture containing 82 per cent. ethylene, 1.6 per cent. methane and one per cent. hydrogen. A single exposure to the catalyst (the nature of which was not revealed) led to a 41.7 per cent. conversion of the ethylene into ethylene oxide. Impurities such as sulfur and phosphorus compounds, in addition to acetylene, which retarded the reaction when using ethylene derived from coke oven gas, are readily eliminated by passing the crude gas over copper oxide at 170 to 200° C. before mixing with air.

Cyanamid-Sylvinite Weed Killers

Use of a mixture of cyanamid and sylvinite in killing weeds is making considerable headway in France. Trials have been carried out for several years past in a number of Departments, and in all cases the results of the application to cereal crop has been favorable. The following conditions are, however, essential to success: Mixture must be applied when the weed plants are still young; the leaves should be wet, the mixture being best applied in the morning after a white frost or a heavy dew; and a day in which there is reasonable expectation of three or four hours of sunshine should be chosen.

New Aluminum Alloy

A German concern is reported to have succeeded in manufacturing a new light aluminum alloy called "Hydronalium." The alloy has a specific gravity of from 2.63 to 2.59, compared with 2.7 for aluminum, and is said to possess great strength, a high resistance to seawater, and to be non-tarnishable. It consists of aluminum with an admixture of 5 to 15 per cent. of magnesium and small portions of manganese.

Chemical Reader's Digest

Whatever John Maynard Keynes writes on the economic situation is certain to be worth reading for, as Walter Lippmann has pointed out recently, the author of "The Economic Consequences of Peace" has so often proved his prophetic insight during the past fifteen years that he has demonstrated that his is the keenest economic brain in the world today. He foretold the depression and forecast its course with an accuracy that should make the whole crew of our professional prophets and unofficial spokesmen blush with shame. Incidentally, he has given us all a tip by which any of us can discover the end of the depression. It is not to be found in a humming Wall Street or even in rising commodity prices; but when credit (which is the foundation of our normal business activity) begins again to be used to make capital expenditures.

Economic Isolation

Keynes has written a tremendously significant article in the Summer Issue of *The Yale Review*. If the Hon. Volstead should come out for immediate repeal; if Cordell Hull should praise the Smoot Tariff; if Francis P. Garvan should write a brief for the I. G.; it would be no less startling than Mr. Keynes' advocating of national economic self-sufficiency as the best means of restoring prosperity and preserving peace. Yet in this article he writes:—

"The policy of national self-sufficiency, although not an ideal in itself or in the long run, is needed for the immediate future to guarantee each country its freedom while attempting to find a new mode of political economy.

"I sympathize with those who would minimize, rather than with those who would maximize, economic entanglement among nations. Ideas, knowledge, science, hospitality, travel—these are the things which should of their nature be international. But let goods be homespun whenever it is reasonably and conveniently possible and, above all, let finance be primarily national. Yet, at the same time, those who seek to disembarass a country of its entanglements should be very slow and wary. It should not be a matter of tearing up roots but of slowly training a plant to grow in a different direction."

Allies for Dean Donham

Less surprising is John Bassett Moore's similar plea in *Foreign Affairs* for June. Judge Moore's views are well known but it is startling to find them set forth in this magazine which has, under the editorship of Hamilton Fish Armstrong, been naturally and consistently internationalistic in its point of view. The swing of opinion towards national self-sufficiency is plainly indicated in the newspapers and current magazines, and every once in a while some new prominent convert steps forth on this platform.

What Will Inflation Do?

Along with the Economic Conference and talk of stabilization, inflation of the dollar captures not a few of the newspaper headlines. What is the business-man's view of the matter, and how will he go about tackling this large-looming factor which may mean so much to his business in the very near future? Will it result in a boom which will be beneficial to the country at large, or will it merely act as a boomerang? Embarking on a new adventure, as it were, the American business man is given some carefully thought out suggestions (and some warnings) about buying, selling, and advertising in a rising market.—*Review of Reviews and World's Work*, June 1933, p. 35.

Cyanite

Although opinions differ as to the advantages and functions of alumina in glass, an increasingly large number of glass plants in this country are adding alumina to their batch. Cyanite, one of the mullite-forming group of high alumina has been suggested as a possibility in glass manufacture and offers opportunities for some interesting speculation. The market price of Cyanite is higher than the price of other alumina sources but it must be borne in mind that Cyanite contains perhaps six times as much alumina, in which case the special advantage in using this would be that one-sixth the quantity could be used bringing the cost down to a very reasonable basis.—*Ceramics Industry*, June, p. 177.

Canada's Production and Trade

Notwithstanding the fact that the depression still retained its grip on the Dominion and a decline of 9.5 per cent. in chemical industry was shown, as compared with 1931 figures, the year 1932 was not an unimportant one so far as Canada's chemical trade is concerned. A number of new factories were opened during the year, and the distinct trend toward made-in-Canada chemicals has added momentum to the improvement of chemical trade within the Dominion. Numerous other chemical operations by large concerns are reported under way—one being a new oxide plant now under construction in Montreal;—another that sodium silicate will soon be manufactured in Canada. Tables and charts enhance the statistics compiled for this review.—*Canadian Chemistry and Metallurgy*, May 1933, p. 86.

Japanese Chemical Output

The British Commercial Consul at Tokyo has reported on the chemical production of Japan, recording notable progress in the production of both heavy and fine chemicals. According to his figures, there is a shortage of domestic production against consumption of 19,500 tons of ash and 5,000 tons of caustic. Because of the favorable exposition of the yen imports will probably be greater than this during 1933, but in 1944 the alkali account is supposed to balance. Since 1931, Japanese sulfate of ammonia has commanded the local market. This production has greatly increased during the past two years. In this year, a total of 842,500 tons shows an increase in the Kawasaki factory of the Showa Fertilizer Company from 72,000 tons in 1931 to 130,000 tons last year; while the Mike Chisso Kroyo Company factory has increased its output during the same period of 5,500 to 30,000 tons. Calcium cyanide production has reached in 1932 an estimated total of 106,600 tons, sufficient for domestic needs. Thirteen superphosphate factories are producing exportable surplus. Acid production is: sulfuric, 949,000 tons; hydrochloric, 35,300 tons; nitric, 19,600 tons; acetic, 5,335,000 tons. These amounts are well below capacity, and it is estimated that the lead chamber output is said to be possibly over 5,000 metric tons daily. —*Chemical Age*, May 20, 1933, p. 458.

Tanning

An art as old as the hills, claiming possibly some 4,000 years of existence, comparatively little development has been made except in the last 25 years. Since that time great strides have been made. Various processes are described, notable attention being paid to the vegetable tanning processes. Starting with the arrival of the hides at the tannery, where the preliminary process for the raw material is gone through, we go on to the depilation of hides, from which we learn of the lime-water process—the prime requisite for loosening the hair prior to its actual removal from the hide. After leaving this operation we round up the processes of scudding, sorting and rounding, deliming, splitting, finally arriving at the chemistry of tanning, with a short conclusion about tanning extracts. Eleven good illustrations complete this story.—*The Industrial Chemist*, May 1933, p. 154.

Carbon Adsorption in Solvent Recovery

Many advantages may be claimed for this process over the older adsorption systems; viz: efficiency of extraction under normal working conditions can easily be maintained between 95 and 96 per cent., purification of the gas is effected during the process of debenzolization, the latter considered to be of great importance. Perhaps the most outstanding advantage is the quality of the benzol produced. Recent advances which have been made in this process are discussed both from the technical and economic points of view. Accompanying illustrations show installations in different English plants.—*The Chemical Age*, May 27, 1933, p. 481.

Enamels and Chemical Study

Study of relation between composition and properties to enable enameler to predict important properties of an enamel from its composition, or conversely, to estimate composition that will be required to produce enamel of given properties lying within attainable limits. Investigation restricted to group of enamels suitable for typical commercial ground coats for sheet iron. Deals only with fusion behavior.

Scheme of Variation in Composition

	Variable Constituents [1]			
Enamel designation	*Feldspar Per cent.*	*Flint Per cent.*	*Sodium oxide Per cent.*	*Boric oxide Per cent.*
A	35	25	17	13
B	35	25	14	16
C	35	25	11	19
D	30	30	17	13
E	30	30	14	16
F	30	30	11	19
G	25	35	17	13
H	25	35	14	16
I	25	35	11	19
J	27	27	17	19
K	33	33	11	13

[1]Each enamel contained, in addition to the above constituents, 7.7 per cent. of fluorspar, 1.7 per cent. of manganese oxide, and 0.6 per cent. of cobalt oxide.

Increase of silica from 25 to 35 per cent. with simultaneous reduction of feldspar from 35 to 25 per cent. caused moderate increase in refractoriness. Full 10 per cent. substitution raised end temperatures of the different tests by 10° to 15° C., or an average of 1° to 1.5° C., for each percentage of change in composition. Increase of boric oxide from 13 to 19 per cent. with simultaneous reduction of sodium oxide from 17 to 11 per cent. caused an increase in end temperatures quite marked near 13 per cent. boric oxide—less perceptible as latter approached 19 per cent. Variations in viscosity had more opportunity to influence results of tests in which involved a great flow of the specimens.—*Ceramic Industry*, Mar. 1933.

Perfuming Rubber

Add the odor of accelerators, oxidants, and the complicated amines to the odor of vulcanized rubber and there is good reason for finding a deodorant for the finished product. A good deal of work has been done, and, according to Max A. Foley, much must be continued. He has suggested that the controlling factors will be the boiling point of the essential oil used and its cost per pound. Published is a table of these data with the results of some experiments carried on with a number of natural and synthetic perfume materials. On two batches of material he publishes a table of these results in which citranellol, cumarone, and pine-tar appear to have proved most satisfactory.—*India Rubber World*, June 1st, 1933, p. 30.

The Industry's Bookshelf

The Program for the World Economic Conference, by the Expert's Agenda and Other Documents with an introduction by James W. Angell, 93 p., published by World Peace Foundation, Boston. $1.00.

In his introduction Prof. Angell clearly defines the fundamental economic problems with which the conference must deal and points out their close relationship with the problems of war debts, disarmament and peace. The summary introduction gives a detailed yet well-rounded picture of the problems that beset us and the possibilities of solving them through international co-operative action. To the business executive who is watching closely developments in London (and what ones are not) the book is an invaluable aid.

Practical Japanning and Enameling, by William J. Miskella, 256 p., published by Finishing Research Laboratories, Inc., 736 Lyman ave., Oak Park, Ill. $3.50.

As in the other books of this series all frills are done away with. It is frankly designed as a handbook on modern metal finishing. Practical workable information, set down in a clear style. Invaluable to all connected in any division of the baked finishing industry.

Practical Automotive Lacquering, by William J. Miskella, 194 p., published by Finishing Research Laboratories, Inc., 736 Lyman ave., Oak Park, Ill. $3.50.

The book is filled with "workable" ideas. In writing this treatise, the author has drawn upon many years of successful experience and study with the result that it deals in a simple, direct manner with the "whys," "wherefores," and the solution of many lacquer problems. Practicability is apparent on every page of this handbook.

Qualitative Analysis, by J. S. Long, H. V. Anderson and T. H. Hazelhurst, 266 p., published by Prentice-Hall, Inc., 70 5th ave., N. Y. City. $2.25.

This book has had its practicability tested by time. In the past six years it has proven thoroughly adequate for the needs of college qualitative courses. The present edition has several minor changes that everyday class use has suggested to the authors, and new material has been added in the sections on Molar and Normal Solutions, Colloids, and Amphoterism. The Analysis of Anions has been greatly enlarged. The section on Complex Ions has been completely rewritten. Of particular value is the large amount of space devoted to formulas, equations and graphic presentation of reactions. This cannot but prove of great value to the student. For this reason alone the book would be outstanding.

Balanced Employment, by Lee Sherman Chadwick, 234 p., published by The MacMillan Co., 60 5th ave., N. Y. City. $2.00.

The author is superbly equipped to write authoritatively on the subject of labor for he has been intimately connected with both sides of the question for 35 years—as laborer, mechanic, designer, engineer, general manager, vice-president and president. His aim is to provoke thought on the great need for radical changes in our economic system. He strips away the confusing details of our complicated economic structure in order that we may better see where sound improvements may be introduced. He urges us to forget tradition, to fight established routine, to bring in improvements that promise relief from existing chaos. Mr. Chadwick urges leaders to reduce employment hours and thereby increase the number of employees. He urges the national coast-to-coast, industry-to-industry adoption of a well-organized, flexible, balanced labor plan, and offers out of the wealth of his own experience in business the outline of such a plan. If you believe this is a dry subject try reading the first two chapters of Mr. Chadwick's book. But, be prepared to do some late reading. Few novels could be as entertaining, still fewer, as instructive and thought-provoking.

Experimental Organic Chemistry, by James F. Norris, 233 p., published by McGraw-Hill Book Co., 330 W. 42nd st., N. Y. City. $1.50.

A thoroughly practical book for the organic chemistry student. The third edition has been slightly enlarged. The novel feature of the new edition is the introduction of experiments to illustrate the use of the more important physico-chemical principles which are applied in the preparation and study of organic compounds.

Chemical Facts and Figures

Codes

To say that chemical industry (using the term in its broadest sense) is "running around like a chicken with its head cut off," trying to orientate its really component but loosely joined divisions with relation to the Industry Control Act, may be summarizing the facts a little too strongly, but certain it is that a great amount of confusion now exists as to whether or not Gen. Hugh S. Johnson, administrator of the Act, and his Advisory Board, will deal with the industry as a whole or with a large number of small units. To date no one seems to have the right answer. Hence the industry at the moment seems to be roughly divided into two camps, one insisting that immediate steps be taken (usually directed into the channel of forming a code for a particular division) and the other group believing in a *laissez-faire* attitude for the time being, combined with a watchful waiting policy on events in Washington.

First group insist that a better deal may be made if each industry division arrives in Washington with a fully prepared code. The second group (perhaps more Washington-wise) insist that no matter what is drawn up now will be so altered that its own authors will not be able to recognize it once the Johnson forces start in to make changes. "Let us watch what happens to the cotton and steel groups first" is the warning of the latter group. "Let's not be handed a dictator chosen by the government is the retort of the former, while busily engaged in successively drawing up and tearing up codes.

Operating Machinery

Considering the tremendous task involved, however, in setting up the necessary machinery for the Act to function, a vast amount of preliminary groundwork has been laid in less than three weeks. It was only on June 16 that America and the "New Deal" plunged precipitiously into the world's greatest experiment in "State Capitalism," when President Roosevelt signed the Industry Control Act before leaving for two weeks of ambling up the rocky New England Coast in the Amberjack 11 with spasmodic executive conferences in the boat's cockpit.

Already 41 business men have been selected to assist in charting the course of the country towards economic recovery.† In this group of outstanding business leaders is Pierre S. du Pont, chairman, E. I. du Pont de Nemours & Co., and Walter C. Teagle, chairman of the board of the Standard of N. J. In addition, a Labor Advisatory Board and a Consumer Advisatory Board are being rapidly formed. Gen. Hugh S. Johnson and his advisors are already engaged in the strenuous task of O. K.'ing the cotton industry code, the first to be considered largely because of the tremendous number of employees or possible employees.

The following summarizes what steps are being taken in the various divisions of the industry.

Chemical Bill was throughly discussed by the M.C.A. at its annual meeting at Shawnee early in June. Certain phases were generally disapproved. Some of these were corrected in the final draft of the bill. Executive Committee was empowered to work with the Synthetic Organic Chemical Manufacturers' Association. Drafting of any preliminary code will largely be in the hands of Cyanamid's president, William B. Bell, newly elected president of the M.C.A., Merrimac's president, Charles Belknap, chairman of the Executive Committee, and August Merz, president of the Synthetic organization. Consensus of opinion of a large number of the leading executives connected with both associations seems to indicate overwhelming sentiment for withholding any drafting of a code until such time as the matter has been further clarified by some statement from Washington.

Fertilizer Industry group, headed by A.A.C.'s Horace Bowker, drew up a tentative code which was submitted to the N.F.A. at its convention at White Sulphur on June 21. It was finally decided to appoint a larger committee to draft a final code and this committee is headed by the Association's new president, John J. Watson. A meeting was held in N. Y. City on June 30.

Lacquer. Under the leadership of Frank G. Breyer a number of lacquer manufacturers have formed a preliminary organization. On July 6 Mr. Breyer represented the lacquer industry in a general meeting of the paint and varnish associations held in Washington for the purpose of clarifying the situation. It is likely that a permanent lacquer industry group will be formed shortly.

Drugs and Allied Lines. The drug group has already formed The Drug Institute and has drawn up a code. The perfumery and cosmetic manufacturers have done likewise; so has the toilet articles group.

Paints, etc. Both the N.P.O. & V. Association and the A.P.V. Manufacturers' Association presidents are working steadily on a program and Ernest T. Trigg has been appointed chairman of a combined committee of both associations. On June 25 this committee met in Chicago and drew up a tentative code which was submitted to the lacquer representative, Frank G. Breyer, in Washington on July 6 and to the representatives of the plastics and cold water paint producers in the same city on July 7.

Shellac Cutters. Manufacturers of shellac varnishes met June 26 at the Brooklyn Chamber of Commerce and

*How The Government Plans To Administer Industrial Recovery Act**

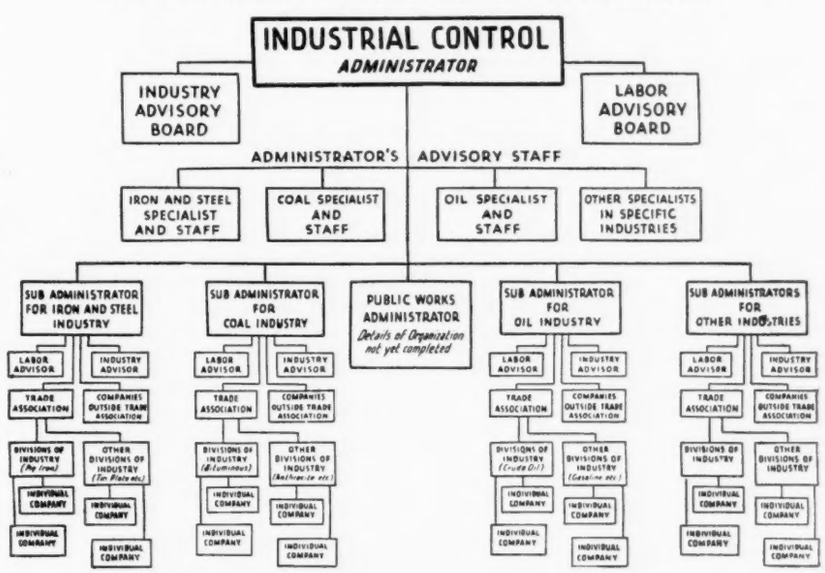


*Chart from *U. S. News*

†On July 9 President Roosevelt approved the Textile Code, first presented to him for executive action.

appointed a committee to proceed with the drafting of a code. Henry Wells of the Twin City Shellac Co., Brooklyn, N. Y., is chairman.

Wax Importers. A committee of three, consisting of Arthur Hoffman, Strohmeyer & Arpe, Frank B. Ross, and Charles Christman of Smith & Nichols, has been appointed to draft a code.

Sulfonated Oil Manufacturers. This group at a recent meeting held in N.Y.City early in June authorized the Legislative Committee to draw up a tentative draft.

Insecticides and Disinfectants. President Dougan has appointed Dr. Robert C. White, Robert C. White Co., Falls of Schuylkill, Philadelphia, and a former Association president, chairman of a committee to draft a code of fair competition. A special drive has been undertaken by the Association to increase its membership at once.

Additional Codes

In addition to these industries the alcohol producers, alcohol jobbers, phosphate producers, chlorine producers, carbon dioxide producers and others have taken preliminary steps toward forming necessary organizations. The industrial Control Act was, of course, the subject most discussed at the recent three day meeting of the Compressed Gas Association at The Sea View Golf Club (June 22-23). Consensus of opinion then expressed was that further clarifying statements from Washington were necessary before the drafting of a code should be undertaken. However, as has been stated, two divisions of this group are proceeding independently of the main body. In the plastics field the Pyroxylin Association through A. E. Pitcher of du Pont Pyralin has taken the initiative among producers of plastics raw materials and an informal meeting has been held at which the practicability of bringing together the makers of phenolic, urea, casein, and acetate materials into a single organization was discussed and a committee appointed with Mr. Pitcher as chairman to formulate a plan and program. In the meantime fabricators of casein under C. S. Lawrence of American Plastics have met and formed a temporary organization committee and the celluloid manufacturers have done likewise.

How long the industry as a whole will be left to run around in circles is problematical. Will the Recovery Board insist that the industry adopt an all-embracing code through some such organization as the former Chemical Alliance, as suggested editorially by CHEMICAL MARKETS on several occasions in the past? This is the question that is being debated wherever two or more chemical executives get together.

Carbon P. Dubbs (Dubbs process for petroleum cracking) was winner in patent suits June 5 after 11 year litigation.

N. Y. Times

Washington

Finis to Prohibition Bureau

Bureau of Prohibition will be merged into the Bureau of Investigation of the Justice Dept., and Bureau of Industrial Alcohol will be left in the Treasury Dept. Justice Dept. will relinquish all supervision of the Industrial Alcohol Bureau, Attorney-General Cummings stated early last month. Industry has fought suggestion to merge Bureau of Prohibition and Bureau of Industrial Alcohol.

On June 12 President Roosevelt by executive order will bring about an end to both the Bureau of Prohibition and the Bureau of Industrial Alcohol and a return to the original form of administration of the permit feature of the prohibition law.

In an executive order effective Aug. 10, he abolished both bureaus and merged their functions with other activities of the Dept. of Justice and Treasury Dept. All supervision of permits has been taken from Dept. of Justice and placed with the Treasury and activities of the Dept. of Justice in detecting and prosecuting violations of the prohibition law will be conducted by the Bureau of Investigation.

Bureau of Industrial Alcohol is merged with Bureau of Internal Revenue. It is expected that James M. Doran, Commissioner of Industrial Alcohol, will be continued in charge of alcohol permit work. He was in charge of the technical division of the dry enforcement work when it was once before a unit in the Bureau of Internal Revenue.

Plan Lacks Details

Details of the reorganization plan have not yet been perfected, but it is probable that the permit supervision work will be placed with a new unit of the Bureau of Internal Revenue: although it is possible that it will be simply a division of the existing miscellaneous tax unit. If a separate unit, it will be headed by a deputy commissioner, who likely will be Mr. Doran.

Valley Authority News

Swann Corp. (newly acquired Monsanto subsidiary) is reported to have offered to trade two undeveloped power sites on Nolichucky and Hiwassee Rivers in Southeastern Tennessee to the Tennessee Valley Authority in return for power to be delivered at a plant to be built on the government reservation at Muscle Shoals. Theodore Swann places a value of $1,300,000 on company power sites.

Dr. Arthur E. Morgan, chief of the Tennessee Valley Authority, has announced that first activities of this board will be to survey Nitrate Plants 1 and 2 at the Muscle Shoals development.

"President will determine time when we will begin construction at Cove Creek," said Dr. Morgan, "but the nitrate plants will be put into use at once. Whole idea back of the Muscle Shoals-Tennessee Valley Authority plan is to develop a place for the balancing of agriculture and industry, and to teach people how to live."

Trade Practices

Federal Trade Commission has released a compilation of trade rules in printed form entitled "Trade-Practice Conference Rules, June 1933." Codes of fair competition adopted by the cottonseed mill, edible oil, feldspar grinding, fertilizer, insecticide and disinfectant, lime, petroleum and petroleum products, solvents industries are included.

Custom Ruling

Wood stain consisting of between 82 and 90 % of absolute ethyl alcohol, not subjected to any denaturing process, and other material, is to be assessed for import duty as a wood stain and not as an alcoholic compound, it has been ordered by Acting Commissioner of Customs Frank Dow.

Compilation of data pertaining to sales of household insecticides in U. S. has been undertaken by chemical division of the Bureau of Foreign and Domestic Commerce.

Better prices for farm products have already improved the farm situation to a considerable extent and present trend is moving towards levels that should result in substantial increases in farm net income after deducting operating expenses, according to estimates published by the State Street Research and Management Corp. in conjunction with the Corn Industries Research Foundation, who estimate that American farmer's cash income for May is 33% above April total and 14% above May of last year.

Atlantic Pyroxlin Waste, North Arlington, N. J., Alexander Scheinzeit, owner, destroyed by explosion June 10, at 9 p. m., with loss of eight lives and injuries to 182 others living near plant. Investigation ordered.

Foreign

American Owned Plants

Secretary Roper holds increasing "tariff pressure" from Canada and Great Britain is primarily responsible for continued migration of American industry to foreign countries in the form of branch plants. He has set forth this view in a report to the Senate.

In an effort to supply the markets of these and other countries by locating within their tariff walls, 711 American companies at the end of 1932 had established 1,819 foreign units and had invested $2,177,693,244 in them. Report shows further that 450,000 foreign workers received employment at American branch plants abroad.

Statistics for chemical and allied plants:

Commodities	*Investment*	*No. of Foreign Estab.*
Drugs and explosives	$38,617,399	76
Dyes and explosives	4,050,700	12
Compressed gases	330,248	27
Paints and varnishes	17,913,574	48
Soaps and toiletries	12,276,531	59
Other chemicals	17,275,410	45
Abrasives	9,307,327	16
Cement Clay products and glass	31,883,583	20

Poland Prohibits

Poland, June 11, prohibited importation until Oct. 10 of a list of products from U. S., Argentina, South Africa and Australia, such as oil seed, wool, tanning chemical products, raw animal fat, solid fats. Special permits for importation will be issued upon basis of compensatory trade.

Foreign Company Reports

Kali-Chemie, A. G. report for 1932 announces a falling off in the sales of both potash and rock salt. Compensation for these setbacks was, however, achieved by steady maintenance of business in the sulfuric acid, sodium sulfate, ammonium sulfate and mixed fertilizer departments. Great activity has been shown in the superphosphate and Rhenania phosphate plants. The annual turnover in mineral pigments has once again been increased, but the production of barium carbonate and sulfur has further declined. Among the activities of the companies in which Kali-Chemie A. G. is financially interested, mention may be made of the forthcoming starting-up of a new barium peroxide plant by the Peroxyd-Werk Siesel A. G.

Etablissements Kuhlmann (French chemical combine) announces a considerable reduction in net profit for 1932, figure being 38.09 million francs as compared with 59.4 million francs for the previous year. But since the company succeeded in reducing the amount written off in connection with investments and subsidiary holdings from 32.58 to 8.66 million francs, ample funds were available for payment of the usual 8% dividend on the ordinary shares. Favorable result is stated to follow introduction of new manufacturing lines. Reduction in value and quantity of their products has therefore only amounted to 3%. In spite of the reduced inland consumption for superphosphates, Kuhlmann has been able to maintain its export figures and has even increased its sale of nitrogen and mixed fertilizers in the export market. A comparatively favorable start is reported for the present year, net profit for the first quarter of 1933 being maintained at the previous year's level.

Foreign Notes

Dr. George C. Clayton, Parliament member, and I. C. I. director, became a knight June 3, with the publication of Birthday Honors conferred by King George. Rt. Hon. Earl of Lytton, chairman of Palestine Potash, Ltd., was made a K. G.

British Dept. of Overseas Trade has just published interesting survey of U. S. chemical export trade. Such an unusual outside viewpoint makes the report particularly important to producers in this country. Price 4s, H. M. Stationary Office, London).

Polish Government reduces import duty on trisodium phosphate imported under permit of the Minister of Finance, from 130 zlotys to 39 zlotys per 100 kilos.

Chinese sodium sulfide imports increased in 1932 to 6,440 metric tons from about 5,100 tons in preceding year. There is no local production in China and requirements for textile printing, dyeing and tanning are increasing.

COMING EVENTS

A. A. T. C. & C., Rhode Island Section, Annual Outing, Warwick Country Club, Providence, R. I., July 14.

American Soybean Association, Louisiana State University, Baton Rouge, La., Aug. 3-4.

Association of Dairy, Food, and Drug Officials of U. S., Pfister Hotel, Milwaukee, Sept. 5-8.

Chicago Drug & Chemical Association, Golf, Bob O'Link Golf Club, July 18.
ing, Chicago, Sept. 8-9.

American Chemical Society, Chicago, Week of Sept. 11.

National Petroleum Association, Annual Meeting, Hotel Traymore, Atlantic City, Sept. 20-22.

American Association Natural Gas Dept., Chicago, Sept. 25.

National Metal Congress and Exposition, October 2-6.

Twenty-second Annual Safety Congress, Hotel Stevens, Chicago, Oct. 2-6.

American Oil Chemists' Society, Congress Hotel, Chicago, Oct. 12-13.

Federation of Paint & Varnish Prod. Clubs, Edgewater Beach Hotel, Chicago, Oct. 26.

National Paint, Oil & Varnish Association, Edgewater Beach Hotel, Chicago, Oct. 27-30.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 4-9.

American Society of Mechanical Engineers, N. Y. City, Dec. 4-9.

Fifth National Organic Chemistry Symposium, Cornell, Dec. 28-30.

Lord Melchett is reported backing Roumanian carbon black factory in the Prahova oil fields. American company recently abandoned similar plans in the same region.

Association News

Leather Authority Lectures

Leather Chemists' Association meeting, Atlantic City, May 31-June 2, attracted over 100 members and friends. Leading speaker—brilliant German leather chemist, Dr. Edmund Stiasny.

Address of the president, Dr. George D. McLaughlin, reviewed work of the association. Fraser M. Moffat, president of the Tanners' Council of America, congratulated the chemists on the work they had been doing. He brought a note of hopefulness to the meeting. He said the tanning industry was sound at its base and as to the high quality of its products.

Especially important were reports made by J. S. Rogers, chief chemist, International shoe; J. H. Highberger, Tanners' Laboratory, and I. D. Clarke, Dept. of Agriculture, Bureau of Chemistry. These dealt with kidney grease stains.

Chemists' Club Golf

Chemists' Club (N. Y.) golf tournament June 27 attracted over 70 to the splendid Westchester Hills Golf Club. Prizes went to the following: President's Cup for Low Gross with a score of 76-7:69, H. J. Hemmingway; 2nd Low Gross with a score of 78-8:70; A. B. Baker; 1st Low Net with a score of 88-18:70, H. M. Hooker; 2nd Low Net with score of 95:28::67, A. L. Loebenberg; Kickers Handicap (86: 8:78), Paul Harrison; "Booby" Prize, John A. Chew; 1st Low Gross for Guests went to J. M. Alvarez of Grasselli with a score of 78:9::69. (He usually shares with "Eddie" Orem, Salesman Association golf honors); Kickers Handicap (92:13::79) J. R. Ordway.

Participants included E. H. Hooker, R. F. Bacon, E. F. Brundage, A. K. Hamilton, G. F. Hasslacher, R. H. DeGreeff, William Callan, Glenn Haskell, Charles Hardy, E. E. Routh, W. B. Thom, J. W. McLaughlin, R. W. Shafor and H. B. Prior. After dinner speakers: E. A. Orem, H. M. Hooker, Glenn Haskell, Ralph Dorland, Frederick Kenney, William Callan and others.

A. C. S. Section Speaker

Prof. The Svedberg, 1926 Nobel chemistry prize winner, was the speaker at at joint meeting of the A. C. S. Chicago section and Section C. of the American Association for the Advancement of Science. Topic—"Sedimentation of Molecules in Centrifugal Fields."

Extract Producers Meet

American Tanning Extract Association formed by chestnut extract producers to comply with provisions of Industry Control Act. Alan G. Goldsmith, George H. Mead Co., N. Y. City, is president, R. W. Griffith, Champion Fibre, Canton, N. C., is secretary and treasurer. Executive committee: E. H. Amory, U. S. Leather; J. S. Silverstein, Rosman Tanning Extract; John H. Teas, Tennessee Extract; Alan G. Goldsmith and R. W. Griffith.

Association Briefs

The Canadian Chemical Association elected following officers at Quebec June 8: President, R. D. Whitmore, Ottawa; Vice-President, Dr. E. C. Burke, Hamilton; Treasurer, Douglas Lorimer, Montreal; Secretary, G. C. Benson, Toronto (re-elected). M. L. Davies, Toronto, is the retiring President.

Annual outing of the Akron Group, Rubber Division, A. C. S., took place at the Fairlawn Golf Club, June 19.

Internationaler Verein der Leder-Industrie-Chemiker (I. V. L. I. C.) will hold its bi-annual meeting in Amsterdam, Sept. 18-21, with International Society of Leather Trades Chemists.

Philadelphia Chemical Club's annual outing was held June 19 with George B. Heckel, Sr., in charge of arrangements.

Chemical Exposition Space

Charles F. Roth, Manager of the Chemical Exposition (Dec. 4-9), when asked about space reservations stated: "At the present date the 14th Exposition of Chemical Industries, which will be held here in New York, in Grand Central Palace, during the week of Dec. 4th, is doing better than normal. Number of exhibitors, and progress of Exposition generally, at this date, is equal to the progress in any of the more prosperous years. It is somewhat better, at a corresponding date, with respect to the last Exposition, which was held in 1931. Three floors of Grand Central Palace are reserved for the event and, at this date, contracts have been signed which take care of two floors and part of the third. In the most prosperous days, number of exhibitors at this time, in advance of an Exposition, has been no greater in proportion than it is now. Accordingly, we feel that the chemical industry is not only planning to utilize the project, but is selecting space with greater care, and planning exhibits with a long-range view to their distinctiveness and sales efficiency."

Heaviest volume of business ever handled in any one month is reported for May by corn refining industry. Total corn grind for month as reported by 11 refiners to Corn Industries Research Foundation, reached record total of over 8,800,000 bushels. April grind was in excess of 7,000,000 bushels, an increase of more than 50% over April of last year.

Obituaries

Albert L. Opper, 48, vice-president, American Commercial Alcohol, died June 12 at his home in Bronxville, N. Y., after three weeks' illness

Mr. Opper became associated with the American Commercial Alcohol in 1928. He had previously been Chicago manager, American Distilling. On joining the newly formed American Commercial Alcohol Company he came to this city in 1928 as general manager of sales and subsequently became vice-president. Mr. Opper started his business career in 1904 with Armour & Co., in Chicago.

He was a former member of the Chicago Drug and Chemical Association, Chicago Paint, Oil and Varnish Club, Chicago Perfumery, Soap and Extract Association, Flavoring Extract Manufacturers' Association, Chicago Association of Commerce, and the Masonic fraternity. In 1912 he was married to Miss Mary D. Grimm, Chicago, who survives.

Philip L. Marston, Richfield Oil chief chemist, died June 10 at Long Beach, Cal.

C. E. Bedford, 48, prominent Goodrich chemist, died June 19 at Akron, O. He joined Goodrich in 1922 after 11 years with Goodyear.

Personnel

Cyanamid has appointed G. M. J. Mackay, Director of Research for companies in the Cyanamid group. His headquarters will be in the general offices, 535 5th ave., N. Y. City.

Former G. E. chemist will guide Cyanamid's research

Mr. Mackay is a graduate of Dalhousie University, Halifax, N. S., where he specialized in chemistry and physics. His graduate work was done in physical chemistry at M. I. T. under Dr. A. A. Noyes. Mr. Mackay was appointed research assistant to Dr. Irving Langmuir in 1910, and was in charge of research and development work in the Insulation Section of G. E. Laboratories.

Std. Development Appoints

Frank A. Howard is new Std. Oil Development president, succeeding E. M. Clark who retires; Charles H. Haupt, chief engineer, vice-president and director of the development company also retired July 1. Dr. R. T. Haslam is now senior vice-president; E. H. Bartow has assumed Mr. Haupt's duties, and Eric Luster will become assistant chief engineer.

New President

P. S. Wilcox has been elected president of Tennessee Eastman Corp., having served for 13 years as vice-president and general manager. J. C. White, general superintendent, was appointed treasurer and general manager.

Current Promotions

Allied's secretary, H. F. Atherton, has been elected a vice-president and general counsel. W. C. King, recently elected a director, has been elected secretary.

E. F. Houghton & Co., Philadelphia oils manufacturer, has made several organization personnel changes. Louis E. Murphy, president, remains in that office.

Major-General Claude E. Brigham has been appointed Chemical Warfare Service head. He has been commanding officer, Edgewood Arsenal, since 1929.

American Potash & Chemical's new borax and boric acid sales division manager—William J. Murphy. He has been connected with the company for a number of years.

L. D. Dodson is now in charge of J. B. Ford, N. Y. City offices. R. D. Sherwood, Cleveland manager, has taken Mr. Dodson's place at Wyandotte. G. T. Robinson, former assistant Cleveland manager, is now in charge of that office.

John J. Felsecker has been added to the staff of D. W. Haering, Chicago water consultants.

Clyde L. Way has recently been appointed by Synthane Corp., Oaks, Pa., manufacturers of Synthane laminated bakelite, to represent them in the St. Louis territory. His offices are at 608 Security Bldg., St. Louis.

Colgate has named A. E. Taylor as manager of laundry soap sales.

William Koach, president of the Quality Glass, Star City, W. Va., is to be president of a new glass works, at Kane, Pa.

And In Addition—

Hubert O. Fox, Dow assistant P. A. has gone to Jones Chemical (Dow's Long Beach, Cal. iodine producing subsidiary)

in charge of purchasing. . . . Warren K. Cooley, former research director, National Association Institute of Dyers and Cleaners, is now president of Caled Products, Brentwood, Md. Company will make specialties for dry cleaners, laundries, textile and leather industries. . . . Dr. Joseph S. Hicks, former assistant director of research for Hecker H-O, Buffalo, is now with Crowell & Murray, Cleveland analytical and consulting chemists. . . . William F. Waldeck has been appointed a research chemist for Pittsburg Plate Glass.

Personal

June Degrees

Coulter W. Jones, president, Jones Chemical, Long Beach, Cal. subsidiary of Dow, was made a Doctor of Laws by the University of Arkansas, on June 5. He is the inventor of the iodine extraction process which has made possible a domestic industry in this country. In 1928 he organized Jones Chemical and started a plant at Shreveport, La. Last year he started a second plant at Long Beach.

Dr. G. H. Clamer, president of Ajax Electrothermic Corp., Trenton, N. J., was awarded honorary degree of Doctor of Science by Ursinus College. He is also to receive shortly Joseph S. Seaman gold medal of the American Foundrymen's Association for outstanding achievements in the metal casting industry.

Eugene C. Sullivan, vice-chairman of the board, Corning Glass, received honorary degree of doctor of science at University of Michigan June 19.

Briefly Summarized

K. M. Simpson, president, International Chromium Process, is a deputy administrator of the Industrial Control Board.

John W. Zemba, Dow chemist was installed June 15 as Grand Knight of the Midland Council Knights of Columbus.

Dr. William M. Grosvenor, N. Y. consulting chemist has been forced to take over entire 10th floor of Chemists' Club. His staff now consists of 20 chemists.

E. L. Luaces is in Cuba installing activated carbon units at a new distillery.

J. L. Maney, formerly with du Pont central control station, Old Hickory, Tenn., is now with the Cellophane division.

New A. A. T. C. & C. members include Eric C. Kunz, Givaudan-Delawanna.

K. F. Duehrssen, Baltimore, N. V. Potash assistant manager, sailed June 3 for a three months' vacation in Germany.

Thomas J. McFadden is acting manager of the paint-varnish associations.

Company News

Marketing CO_2

Pure Carbonic reports final consummation of negotiations, pending for more than a year, which materially affect entire carbonic gas industry, especially method of distribution. Gas will now be delivered in solid form and reliquefied at point of use, instead of being transported in heavy steel cylinders, which has been the method since carbonic gas was first used commercially for carbonating beverages, thus saving over 80% of the cartage cost.

Both laboratory and commercial tests over a period of four years have so fully demonstrated economy and practicability of this method of distributing carbonic gas to soda fountains and bottling plants in N. Y. City and vicinity, that its use will now be extended to all parts of U. S., Canada, Mexico and Cuba under a license pact entered into between Carbo-Frost, Inc., and Rudd Patents, Inc., which control patents, and Pure Carbonic, a subsidiary of Air Reduction, and U. S. I. Negotiations are also pending in Great Britain, Germany, France and Italy for licenses in those countries.

H. B. Rudd, vice-president and chief engineer of Carbo-Frost, Inc., and president of Rudd Patents, Inc., is inventor and patentee of new carbonic gas liquefier.

New Germicide

"Cresophan" is a powerful new antiseptic and germicide made by Fries Bros., 92 Reade st., N. Y. City and distributed by R. W. Greef & Co., 10 E. 40 st., N. Y. City. It is an alkyl derivative of meta cresol and is produced in two grades: Cresophan Pure, M. P. 23.1° C and Cresophan Technical (containing some para cresol derivatives. Odor and taste resemble thymol. Particularly active against pyogenic bacteria such as staphylococcus aureus.

Revolutionary Ceramic Ware

U. S. Stoneware is now marketing a revolutionary type of ceramic ware known as "Lectrovac." New material was developed through three distinct improvements or brand new methods of manufacture. (1) During mixing, clays are subjected to an electrolytic treatment; (2) new products have been added that never before were used; (3) the clays are deairated in specially build equipment. Complete data are available by writing company's N. Y. City offices, 30 Church st.

Thiokol Appoints Monsanto

Thiokol Corp., Yardville (Trenton), N. J., has made an arrangement with Monsanto Chemical Works, Ltd., of London, England, to market "Thiokol" in Europe. "Thiokol" is the oil-proof, synthetic rubber which, up to the present, has been manufactured solely in U. S. and which is being used extensively in many industries.

CO_2 Production

Production of dry ice, or solid CO_2, has shown rapid expansion during past few years, with an estimated production of 140,000,000 lbs. for 1933, according to Lewis C. Chamberlin, manager, solid carbon dioxide division, Michigan Alkali. In 1928 only 12,000,000 lbs. were manufactured, and last year 122,000,000 lbs. were produced in U. S.

Worth Noting

Birmingham Tank has developed aluminum paint for bulk storage tanks which checks evaporation by deflecting heat and light.

Grasselli has developed, according to Chemist E. B. Alvord, new non-arsenical compound for corn worm. Material-barium silicofluoride.

Japan Soda, Japan, has a plant capable of turning out thirty tons of ethylene glycol a month.

Manufacturers' Soap & Chemical, Cleveland, is completing an addition to its plant which will practically double its capacity.

General Refractories has increased wages in varying amounts up to 20%.

Du Pont increased by 10% monthly salaries of all employees except those whose salaries are fixed by contract, effective July 1.

Ajax Electrothermic Corp., Trenton, N. J., has just prepared Bulletin No. 8 which describes Ajax-Northrup Furnaces for melting and heat treating and is of special interest to colleges and research laboratories. Copies are available by writing company direct.

P. & G. is marketing "Ivory" a new shaving cream.

Parker Rust Proof May sales were the third largest in the history of the company.

American Chemical has leased one-story building at 425 W. West st., Baltimore, and is installing equipment for the manufacture of floor polish, chemicals and other products. Ralph L. Jones is manager.

E. Soonenschein has severed connection with City Chemical and has formed his own concern, E. Soonenschein & Co. New concern is at 450 4th ave., N. Y. City.

Cataract Chemical, Buffalo, manufacturer of chemicals used in making soles for women's shoes more flexible, has developed an inexpensive drying rack that will not warp or buckle.

Pure Carbonic recently opened Denver warehouse at 2161 Blake st. for the convenience of trade in Colorado and vicinity. Company reports increasing amount of business on carbonic gas in that territory.

McLaughlin Gormley King, Minneapolis, is developing new insecticide, made by dissolving selenium in an ammonium sulfide solution and having a formula $(KNH_4S)Se$. A 30% solution is given the name Selocide.

Second unit of Pittsburgh Plate Glass' plant at Creighton has resumed operations. This unit will employ about 700 men who will be given full time work. Officials state this is the first time both units of the plate glass plant have been in operation simultaneously since early in 1931. Output will approximate 50% of capacity.

Syracuse Road Machinery Co., Syracuse, N. Y. has taken over sale and manufacture of the G. S. C. Hi-Speed Spreader. Production has already begun on the new unit, which have been greatly improved over the earlier models, and prompt shipments are being made. G. S. C. Hi-Speed Spreader handles gravel, sand, cinders, crushed stone, and calcium chloride at any speed with an even spread assurance.

Allied's June Tonnages

Allied announced July 5 that tonnage of all of its products shipped for June was the largest in volume since October, 1930, a 33 months' period.

Tonnage shipped in May was the largest in volume since December, 1931, an 18 months' period.

New Zapon Finish

Tremendous popularity of suede and suede-like materials has led to development of a revolutionary new finish by Zapon, a subsidiary of Atlas Powder. It is known as Sprayed Izarine Finish. Formerly the covering of any article with suede or imitation suede meant cutting and pasting innumerable pieces and then laboriously mounting them. Now a suede-like finish can be given to any surface by merely spraying a unique enamel and an equally unique Izarine powder with an air gun.

Process, which is completely covered by patent applications, is simple, but research covering many years was necessary before it was perfected. Problem was to formulate an enamel that would remain wet long enough to leave time for the spraying on of the Izarine Powder and yet dry rapidly thereafter without the need of baking or other artificial forcing.

Bureau of Mines has released R. I. 3216 "Limits of Inflammability of Natural Gases Containing High Percentages of Carbon Dioxide and Nitrogen."

Heavy Chemicals

Sulfur Shipments

Shipments of sulfur companies continued to expand in June over May and April. It is reported that many fertilizer companies will operate at capacity at least part of the summer contrary to usual trend. With steel production at 50%, demand for sulfuric is much better.

More than 82% of sulfur produced in this country goes into sulfuric. Of the 7,625,000 tons of sulfuric used in 1930, 2,350,000 tons went into manufacture of fertilizers, 1,485,000 tons to petroleum refiners, 820,000 tons to chemical manufacturers, 600,000 tons to coal by-products, and 660,000 tons to steel industry. Volume of sulfur sales in 1932 and in first quarter of 1933 reached levels as low or lower than in 1921 and 1922.

Earnings of the two leading sulfur companies should show, according to *Wall St. Journal*, a material improvement in second quarter over results in first three months, with all indications pointing to an even more substantial gain in third quarter.

Texas Gulf reported a net profit of $976,704 or 38c a share on 2,540,000 shares in first quarter and will probably show more than 50c a share in second quarter.

Freeport Texas more than covered in first quarter dividend requirements on its common stock, now on a 50c quarterly basis, and in second quarter will earn a substantial amount in excess of first quarter's profits.* Freeport has outstanding 729,844 shares of common stock and 25,000 shares 6% pref.

Following table of earnings and net per share shows possibilities of sulfur companies should volume of business return to normal levels:

	1932	*1931*
Tex. Gulf net	$5,910,492	$8,942,602
Share	$2.32	$3.52
Freeport net	$2,005,097	$2,376,782
Share	$2.75	$3.26
	1930	*1929*
Tex Gulf net	$13,972,085	$16,247,478
Share	$5.50	$6.39
Freeport net	$3,124,185	$4,085,041
Share	$4.28	$4.77

Acetic Schedules Revised

Heavy chemical manufacturers enjoyed the largest tonnage in June for any month so far this year, and in many instances, for any month in 1932 also. Demand tapered slightly near the close of the month, due to the half-yearly inventory period and a rather extended July 4. Producers have, however, booked sufficient tonnage for July delivery to warrant the statement that summer production period will not follow the usual summer seasonal trend.

Outstanding in the month's market news was the further advances in the acetic schedule. This was, of course, the direct result of the additional ¼c advance made in acetate of lime on June 9, which price was guaranteed only to Aug. 1 for contracts. Synthetic acetic producers fell in line, making two separate advances June 8 and 27.

*Report earned $1.30 for 1st half compared with $1.45 1st half of 1932.

Important Price Changes

Acid Acetic, 28% bbls.	$2.91	$2.78
Glacial, carloads, drums	10.02	9.58
U. S. P. Reagent Carloads, carboys	10.52	10.08
Arsenic, red	.11¼	.10¾
Calcium acetate	3.00	2.75
Copper sulfate	3.75	3.25
Egg Albumen	.81	.80
Yolk	.43	.42
Lead Acetate brown	9.50	8.50
White, broken	11.00	10.00
Granular	11.00	10.00
Crystals	10.50	9.50
Powdered	11.25	10.25
Nickel Sulfate, double	.12	.11
Single	.12	.11
Sodium Bichrom. spot	.04½	.04¾
Sodium Stannate	.31½	.26½
Tartar Emetic, tech.	.21	.20
Tin crystals	.36	.31
Tetrachloride	.23	.18½

A glance at the accompanying list of important price changes indicates that a large proportion of these were in the metallic salts and a further glance at the price changes listed in the Metals and Alloys News Section at once discloses the reason. Copper sulfate was advanced ¼c again July 6 bringing the present level to $3.75 against a low of $3.00 for 1933 and an all-time low of $2.75 reached in 1932. With imported virtually out of the picture and the agricultural sections in better financial shape, the outlook is particularly favorable to larger domestic consumption.

In most quarters the spot advances in sodium and potassium bichromates were looked upon as a possible forerunner of higher 1934 contract prices. Competition for existing contracts last fall was so keen that the price level is admittedly below manufacturing costs at present. A somewhat similar significance was attached to the advance in spot Metropolitan Area ash and caustic prices on June 15.

Belief is now general that the Industrial Recovery Act as one of its practical results will force prices of most commodities to higher levels. While it is thought that heavy chemicals will not be affected to anything like the same degree as some of the other more speculative items of a chemical nature, it is quite apparent, say most of those in a position to know, that the past three months has seen a most profound switch from a buyers' market to one at least where the seller will not be willing to make unreasonable concessions merely for the sake of moving goods.

Heavy chemical consuming industries—steel, paper, tanning, paints and related

products, glass and even paper have advanced production schedules to such a point that large chemical surpluses are already largely depleted.

Jap Caustic Figures

Japanese caustic production in January amounted to 4,213 metric tons, a gain of 224 tons over December, and 1,048 tons over January, 1932. Total 1932 output was 71,327 metric tons. Japan Bleaching Powder Producers' Association agreed to continue through March production curtailment rate of 30%. Production during January of bleaching powder amounted to 5,545 metric tons, an increase of 395 tons over December, and 2,557 tons over January, 1932. Total 1932 output was 42,685 metric tons. Nihon Chisso K. K. of Osaka has taken over Osaka Soda patent rights for manufacturing caustic and proposes to produce approximately 500 tons per month. With some 1,000 tons of bleaching powder obtained as a by-product from the manufacture of caustic soda is causing bleaching powder manufacturers considerable concern and they are endeavoring to persuade the Nihon Chisso K. K. to join their association.

Sulfuric Statistics

Output of by-product sulfuric at copper and zinc plants in 1932, in terms of 60° acid, amounted to 600,334 short tons, of which 258,994 tons were produced at copper plants and 341,340 tons at zinc plants. At zinc plants, 65,510 tons of sulfur were used to supplement gases derived from roasting of zinc blende, and 244,644 tons of sulfuric were produced therefrom. No sulfur was used at copper plants. In 1931, 862,729 tons of by-product sulfuric were produced. Of this amount, 436,111 tons were recovered at copper plants and 426,618 tons at zinc plants. Sulfur amounting to 100,956 tons were used at zinc plants for recovery of 381,216 tons of sulfuric.

Swann Reports

Theodore Swann, president of Swann Chemical, reports that all of the phosphoric furnaces of the Anniston plant are running at capacity. Employed at these operations are said to be more than 600 men, and is 40% above employment in March. Indefinite operations at capacity are anticipated.

Sodium bichromate imported into Great Britain and Northern Ireland increased from 1,202 cwt. in March to 2,798 cwt. in April. Between the two months German supplies rose from 299 cwt. to 896, and American supplies from 903 cwt. to 1,701 cwt.

Southern Alkali Plans

H. K. Ferguson Co. has received contract for construction of a $7,000,000 plant on tidewater at Corpus Christi, Tex., for Southern Alkali (Cyanamid-Columbia Chemical).

Plans were made by Columbia Chemical. G. A. Herwick of the Ferguson company will be in direct charge of operations, to start immediately.

Belgian Copper Sulfate

Belgian copper sulfate production expanded from 6,000 metric tons in 1924 to approximately 25,000 tons annually for 1929-1931. There are two principal producers. Union Chimique Belge and S. A. Metallo-Chimique. Exports, which account for a large share of the output, totaled 15,292 tons in 1930, 20,838 in 1931 and 24,501 in 1932. France was the destination for two-thirds of the 1932 exports.

Sulfur Consortium

At an Italian Cabinet meeting held in May bill was approved providing for continued functioning of technical mining section of Sicilian Sulphur Consortium dissolved July, 1932.

This section will direct its activities toward technical improvement of sulfur mining methods in Sicily and will be known as the Board for the Improvement of the Sicilian Industry (ente per il Miglioramento dell'Industria Solfifera Siciliana).

Organization will be administered by a board consisting of delegates from Ministry of Corporations and of Finance and representatives of the operators.

Statistics on Calcium Acetate and Methanol*

Methanol

Gallons

	1931 March	1932 March	1933 Feb.*	1933 March	Totals 3 mos. (Jan.-Mar.) 1931	1932	1933
Refined—							
Wood distillation—							
Production	253,494	104,279	117,236	124,086	785,411	396,061	407,182
Shipments	199,500	76,401	90,285	93,848	592,148	295,265	243,679
Stocks, end of mo.	519,305	250,246	351,440	381,678	.....	.....	.....
Synthetic—							
Production	732,233	514,119	324,527	178,232	2,164,521	1,646,085	855,507
Shipments	490,795	425,596	625,484	665,702	1,404,148	1,286,472	1,803,967
Stocks, end of mo.	1,856,413	2,238,220	2,749,684	2,262,214	.....	.....	.....
Crude—							
Production	509,518	287,535	256,826	268,064	1,529,265	721,518	837,371
Shipments	†	†	272,505	261,350	†	†	778,040
Stocks, end of mo.	506,685	450,581	281,484	288,198	.....	.....	.....

Acetate of Lime

Pounds

Production	7,372,559	4,531,236	3,747,754	3,792,619	22,388,051	9,874,112	12,282,200
Shipments	4,465,248	6,010,614	1,963,434	2,468,760	13,178,382	12,566,527	6,145,502
Stocks, end of mo.	31,839,653	7,136,433	11,946,658	13,271,692	.....	.....	.....

*34 plants reporting.

Mutual Reopens J. C. Plant

Frederick W. White, Mutual Chemical, Co. of America's president announced July 11, that the Jersey City Works is again producing bichromate as well as the Baltimore plant. Shipments are very heavy.

Mexican Carbide

Calcium carbide production has been started by Cia. Productoro de Carburo de Calcio, Mexico, D. F. which has a three-furnace plant with a capacity 250 ton a month. Company is studying practicability of establishing second plant in northern part of Mexico, in Monterrey on Torreon.

Lower Freight Rates

Pennsylvania has agreed to proposals to lower freight rates on three classes of commodities from Manasquan, N. J. to Trenton, N. J. Under new ruling, carload lots of feldspar will be 9½c per 100 lbs. as against former rate of 16c. Ball clay will be 8c as against 16c and China clay also at 8c as against 16c.

Miscellaneous Notes

Sayer & Son, Ltd., and other associates, 822 Main st., Vancouver, Canada, are now shipping quantities of natural Epsom Salts from lakes located near Vancouver. Machinery, stills, etc., have been installed. Company will consider agency agreements with distributers.

Dumping ban on German disodium phosphate lifted June 14.

Sulfur royalties provided $25,154.74 in May and $15,207.75 in April to Louisiana state treasury from Lake Peigneur mining.

Kale-Chemie reports an improvement in calcining step in production of potassium carbonate.

Youngstown Sheet & Tube Co. awarded contract for 900 tons of various sized pipe for Southern Alkali Corp.'s new plant at Corpus Christi, Texas.

Dealer John A. Chew officially-unofficially-Chew, Chew & Chew, has been forced to take larger quarters on eighth floor of 60 E. 42 st., N. Y. City.

Briefly Summarized

Sulfuric consumption in Canada increased from 118,600 tons in 1931 to 136,200 tons in 1932. About 80,000 tons were used by producers. . . . Silicate exports from Germany dropped from 22,541 metric tons in 1927 to 15,727 tons in 1932. Production also declined, amounting to about 50,000 tons. . . . Elarton salt works, at Warwick, Ont., has resumed operations. Plant, inactive for some years was recently taken over by British interests. . . . British imports of chemical products showed an increase of £233,058 during April in comparison with April, 1932. . . . Glycerin imports into Canada dropped from 3,728,177 lbs., valued at $272,224, in fiscal year 1931-32

to 270,199 lbs., valued at $21,194, in year ended March 31, 1933. . . . Heavy chemical production in Japan showed an increase in first half of 1932 . . . .Cyanamid has been granted its petition to city of Niagara Falls, Ontario, asking annexation. . . . Chemical Research Corp., Baltimore, has been chartered under the laws of Maryland with an authorized capital of 1,000 shares of common stock of a par value of $10 per share. Reuben Israelson, John G. Buettner and Edward Doeplicz, all of Baltimore, are named as the incorporators. Company is loacted at 752 Carroll st. . . . Henkel, Dusseldorf, largest German silicate producer, is reported operating at slow pace with production and exports off 50%. Total German production estimated at 50,000 tons.

Factory employment in chemicals and related products decreased 2.3% during May. It was, however, 1.6% above level for May, 1932. Payroll totals increased 4.3% in May and rose to within 6.7% of total for May, 1932.

In spite of the decline in May, employment in chemical industries continued well above general average and compared much better with that in May, 1932. Although payroll totals had a smaller relative increase, these, also, were higher than average and compared better with those in May, 1932.

Employment

	May 1933	*April 1933*	*May 1932*
Chemicals	88.4	85.2	86.1
Cottonseed, oil, cake and meal.	23.2	27.8	34.7
Druggists' preparations	66.2	67.7	73.3
Explosives	75.0	75.1	75.0
Fertilizers	67.2	117.4	58.3
Paints and varnishes	71.6	65.3	73.1
Petroleum refining	63.6	62.9	64.8
Rayon and related products	147.0	133.1	129.9
Soap	95.8	94.0	94.2

Payroll Totals

	May 1933	*April 1933*	*May 1932*
Chemicals	63.7	59.4	65.6
Cottonseed oil, cake, and meal.	22.0	23.3	34.3
Druggists' preparations	63.1	62.3	73.4
Explosives	46.9	44.9	54.3
Fertilizers	36.8	59.4	41.1
Paints and varnishes	57.9	48.7	64.4
Petroleum refining	53.7	52.6	59.8
Rayon and related products	117.8	103.1	110.6
Soap	78.8	76.8	85.4

British exports of basic coaltar products in first quarter of 1933 compare with those in the corresponding period in 1932:

		First Quarter	
		1933	*1932*
Anthracene	cwt.	149	22
Benzene and toluene	gal.	29,511	129,011
Cresylic acid	gal.	223,036	270,896
Naphtha	gal.	20,822	6,027
Naphthalene	cwt.	43,316	21,288
Phenol, crude	gal.	30,671	6,870
crystal	cwt.	861	2,524
Tar oil, creosote, etc.	gal.	2,981,760	2,995,480
Other sorts	cwt.	37,998	41,939
Total value		£119,729	£147,979

Judgment has been reserved in appeal which British Celanese, brought against dismissal of their action against Courtualds, for infringement of three acetate spinning patents. Since Celanese dropped appeal against one patent, only two patents are now involved.*

*Rumors are that suit will be brought to the House of Lords.

Fine Chemicals

Raw Materials Force Prices Up

In the past month producers of fine chemicals have been forced into a large number of upward price revisions, due largely to the advances made in several of the most important raw materials. Sharp advances in metallic mercury, metallic bismuth, iodine, quinine, crude tartrates and caustic potash have been forced summarily on the fine chemical producers who, in turn, have translated these higher costs into higher prices for finished materials. It is particularly important to note how sharp the advances in most cases have been in the past 30 day period.

Behind the advance in raw materials, of course, is the precipitous drop in the purchasing power of the dollar as expressed in foreign currencies. The purchasing value of the dollar is now about three-quarters of what it was before the abandonment of the gold standard, or in other words in terms of foreign commodities purchased the dollar is now worth less than 75c.

Japan Camphor Statistics†

Crude camphor production in Japan totaled 3,544,997 lbs. in year ended March 31, 1932. In preceding year total was 4,585,568 lbs. Camphor oil production totaled 15,921,621 lbs. in 1931-32, against 17,275,246 lbs. in preceding year Production of both articles was divided 60% in Taiwan (Formosa) and 40% in Japan proper. Exports of camphor from Taiwan in 1931-32 included 3,138,202 lbs. to Japan and 1,483,360 lbs. to U. S. Exports of camphor oil included 8,403,116 lbs. to Japan. Exports from Japan were: Camphor, total, 3,107,287 lbs., to U. S., 1,089,905 lbs;. camphor oil, 2,492,496 lbs.

British Glycerine Imports

British glycerine imports in first quarter totaled 14,690 cwts., valued at $18,860, compared with 6,814 cwts., valued at $9,568, imported in first quarter of 1932. This year's imports comprised 12,715 cwts. of crude glycerin and 1,975 cwts of distilled. Exports were lower this year, totaling 40,154 cwts., valued at $79,158, against 59,187 cwts., valued at $111,088, in 1932 period. Exported glycerin, this year, consisted of 38,747 cwts. of distilled and 1,427 cwts. of crude.

Bismuth Rate Defined

Bismuth, classified for duty at 35% ad valorem under paragraph 22 of tariff act has been held dutiable at 25% under paragraphs 5 and 23. Ruling was made by first division of U. S. Customs Court in protests by J. Doak Co., Cleveland.

†Tariff Commission on July 26, will hold Tariff hearing.

Important Price Changes

Acid, Tartaric, imp.	$0.24½	$0.23
Dom, powd.	.22	.20
Bismuth, metal	.95	.90
Bismuth, subnitrate	1.10	.95
Camphor, slabs	.45	.42
Cream of Tartar	.15½	.14¾
Iodine, resublimed	3.25	2.80
Mercury, metal	62.50	56.50
Mercury iodide, Red	4.00	3.85
Yellow	4.10	3.95
Mercurials, calomel	1.23	1.15
Corrosive Sublimate	.77	.67
Red Precipitate	1.34	1.24
Potassium iodide	2.75	2.15
Silver nitrate	.26½	.24¾
Sodium iodide	3.50	2.75
Tartar Emetic, U. S. P.	.26	.25

Charles Pfizer have completed their July price list. Twelve advances and one decline are shown.

Givaudan & Cie, according to the *Givaudanian* published by Givaudan Delawanna has concentrated all research in a new building at Geneva.

Castle Peak Quicksilver, Carson City, Nev., Mina Mercury, Mina, Nev., have resumed production.

Price Advances

N. Y. Journal of Commerce reports that while the general level of prices was almost exactly the same at the beginning of July as two years earlier, the major groups of commodities show substantial changes for the two year period as indicated:

Grain	+39
Textiles	+ 8
Building materials	+ 8
Fuels	+ 5
Paint materials	+ 5
Nonferrous metals	+ 3
Chemicals	— 4
Iron and steel	— 7
Foods	—10
Pulp and paper	—12

Glass and Ceramic Notes

Glass Container, is remodeling $500,000 Los Angeles plant . . . Mansfield Vitreous Enameling (Westinghouse) is again operating . . . Ceramic Color & Chemical's president, W. J. Wenning, did the artistic work on Republic Steel's Century of Progress exhibit. In the reproduction of an oil painting 35 district colors of porcelain enamel were used . . . A.S.T.M. Committee on Refractories (C8) is ready to begin work on preparation of tests and specifications for high-temperature insulation and for insulating refractories . . . N. Y. State College of Ceramics was dedicated June 12 . . . Owens-Illinois' glass brick house at the Chicago Exposition is colored with Vitro Mfg. Co.'s (Pittsburg) materials . . . Frederick B. Stevens, Detroit chemical and sundries supply house, is now Michigan distributor of Vitrefrax's (Los Angeles) Argon Mullite brand of refractories.

California Ink plans to purchase 10,000 shares of its stock.

Chemical Fads and Fancies

George A. Whiting, Standard Acid & Chemicals' president is wholeheartedly with President Roosevelt's plans, even to yachting. He entered "Lady Susan" in the ocean race from New London to Gibson Island in the Chesapeake. She did not finish.———London's "Big Ben" has a rival at last. Shell Oil's new clock atop a fine new office building on the Thames has been dubbed by Londoners "Big Benzine."———According to *The Wall St. Journal* Carbide has spent $50,000,000 in the past three years in expanding plant facilities.———A bronze portrait of the late Arthur S. Somers, former Fred L. Lavenburg Co. president and prominent in N. Y. City educational affairs for years, was unveiled June 12 in a Brooklyn high school.———Warren N. Watson, M. C. A. secretary, has been elected president of the Washington Trade Association Executives.———Elon H. Hooker came out unscathed from an automobile accident near his Greenwich home on June 15.———It is said that the street illumination of the future is a sodium vapor electric lamp, yellow, of course, and three or four times stronger than anything in present use.———Lamp casts no shadows.———Homer Whitman, Hooker Electrochemical's P. A. was re-elected chairman and E. E. Brainard, P. A. for Merrimac, was elected secretary of the chemical and allied products buyer's group of the National Association of Purchasing Agents.———Dr. C. R. Downs of Weiss and Downs is recovering from a minor operation.———J. Davidson Pratt, general manager of the Association of British Chemical Manufacturers, has returned to England.———Miss Georgia Hencken, granddaughter of Mr. and Mrs. William S. Gray, Sr., was married to George H. Perkins on June 3. On June 17 Society and Chemistry helped the Grays celebrate their 50th wedding anniversary at their Greenwich place "Graystone"———. William Crady, son of Wood Crady, vice-president of Federal Chemical, won the Trona Gold Cup, doing the Death Valley course in 70.———According to Dr. Little's *Industrial Bulletin* there are nine different kinds of water. Well, what of it?———John S. Shaw, Hercules Powder accident expert, suggests that possibly the epidemic of accidents in plants generally may be due to the "worried" worker.———Prof. Yandell Henderson of Yale, states that methylene blue, which has been widely heralded as an antidote for cyanides and carbon monoxide poisoning, may kill instead of saving.———I. C. I.'s Lord Melchett was elected president of the British Science Guild on June 19.———Lammot du Pont is a member of the "Stearing Committee of the National Association of Manufacturers.———The Hempstead Country Club course was all the Salesmen Golf Committee said it was in their ballyhoo.———Associations' best golfers all repeated as per usual. Winners included Charlie Kelley, Al Alvarez, Eddie Orem. Ira Vandewater and Cline McKenna proved to be the best guessers, winning first and second in the "Kickers". Solvay's Merritt was the best putter.———Chemists' Club tournament (reported in detail elsewhere) attracted over 70. It will be repeated in September, according to Bob Quinn, "general manager".———Harry Albert Metz, son of Gen. Herman A. Metz., was married recently to Miss Virginia Dougall. They will summer at Mamaroneck.———Pierre S. du Pont 3d graduated from M. I. T. on June 5 and was married June 24 to Miss Jane Holcomb of Waterbury, Conn.———

Charles H. MacDowell, honorary N. F. A. member called to Washington to assist

Charles J. Brand reported the highlights of the N. F. A. convention over the N.B.C. system on June 23.———He also has had several speaking engagements explaining the Agricultural and Industrial relief laws.———Pierre S. du Pont is Delaware's one-man liquor control board and the one-chemical-man on Gen. Johnson's advisory board.———Hon. Edward B. Almon, Alabama representative for 10 years and one of the foremost leaders in the fight for operation of the Muscle Shoals properties died June 22.———Dr. Earl W. Flosdorf, University of Pennsylvania Medical School asserts that a loud noise will soft boil an egg, crack oil into acetylene gas; other phenomena he reports following the tooting of a horn include: grape sugar extracted from cane sugar and a complete chemical reaction in a solution of salt in water. If the Doctor is right our ideas on production will have to be radically altered.———Bureau of Standards has reported that sluggishness of chemicals in the battery is one of the causes contributing to slow starting of automobiles in winter months.———Francis P. Garvan, Mrs. Garvan and their four children sailed recently for Europe. He will observe the Economic Conference for the chemical industry and then go to Scotland for grouse hunting.———Charles H. MacDowell, former Armour Fertilizer president, has moved to Washington to help the fertilizer recovery work.———June 7 marked the 27th anniversary of the passage of the Denatured Alcohol Act. U. S. I. is the only alcohol company now operating that was in the field at that time.———Charles Pfizer & Co. has unearthed a new sample "racket." Young boys were writing in under company names for samples of dangerous materials such as corrosive sublimate and strychnine.———Olive oil is being considered as a lubricant in Italy in place of petroleum oils.———Shreve M. Archer, president, Archer-Daniels-Midland, was reelected a director of Northwest Bancorporation.———Horace Bowker addressed over 3,000 at the annual field day of the N. J. State College of Agriculture at New Brunswick on June 14.———Gustav Dalen, Swedish scientist has been awarded the James Turner Morehead Medal, awarded annually by the International Acetylene Association.———Vitamin beer is the latest idea introduced to brewers.———Mr. and Mrs. Horace Bowker sailed on the *Conte di Savoia* July 8.

Rayon Data

World rayon production, first quarter, is estimated at 63,620 metric tons in quarterly survey by *British Rayon Record*. This is a decrease of 3,300 tons from preceding quarter, but is approximately 5,000 tons higher than total for first quarter of 1932.

Decline in American production, which was down to approximately same level as in first quarter of 1932, was main factor contributing toward lower figure.

Estimates by countries for first quarter follows (quantity in metric tons):

	1933	*1932*
Belgium	1,100	1,050
Great Britain	8,180	8,765
Canada	820	780
Czechoslovakia	620	680
France	5,750	5,180
Germany	8,035	6,000
Holland	2,570	2,040
Italy	8,735	8,835
Japan	8,470	6,030
Poland	810	820
Switzerland	1,315	1,330
U. S.	16,300	16,270
Other countries	915	860
Total	63,620	58,640

Tubize restored June 11 wage cuts which affected 2,200 60 days ago at Hopewell.

Industrial Rayon in declaring 75c dividend on capital stock raised annual rate from $2 to $3. Dividend paid July 1 to stockholders of record on June 19.

General 5% rise in acetate and viscose type rayon yarn was made early in June.

Coal Tar Chemicals

Benzol Tax Defined

Unsettled tax status of industrial benzol has been finally clarified by enactment by Congress of an amendment to revenue act of 1932, which states that the tax under the gasoline provision does not apply.

Bureau of Internal Revenue first ruled that industrial benzol was not taxable as gasoline. Later, in new ruling, Bureau decided that, because of wording of the law, it would be necessary to collect the tax.

Manufacturing Chemists' Association immediately filed brief with the Senate Finance Committee requesting amendment to H. R. 5765 Section 208 (g) as passed by the House; to insert the word "motor" before the word "benzol" in the definition of gasoline under Section 617 of the Revenue Act of 1932.

Exemption is provided by an amendment to the revenue act and is contained in section 211(b) of the industrial control act. It is now in effect and reads as follows:

"As used in this paragraph the term "benzol" does not include benzol sold for use otherwise than as a fuel for the propulsion of motor vehicles, motor boats or airplanes, and otherwise than in the manufacture or production of such fuel."

Warren N. Watson, the M. C. A. secretary, estimates that the ruling will save the chemical industry $150,000 annually and the collection of such tax was clearly not the real intent when the original law was passed, no matter how ambiguous the wording may have been.

Few Price Changes

Coaltar chemicals continued to remain firm. Price changes, very few during the entire period of deflation, were likewise very few when compared to the numerous changes recorded in other divisions of the chemical industry in the present era of generally rising values. The improvement in steel activity from 10%, prevailing early in March, to over 50% at the end of the past month has, of course, brought about an increase in coaltar materials, but fortunately, the generally better condition in business has permitted producers to market without accumulating any surpluses.

Output of benzol in May was 18.9% greater than in April. Output of benzol amounted to 4,411,544 gals in May, as against 3,710,495 gals. in April and 3,982,000 gals. in May last year.

Coking coal charged in by-product ovens amounted to 2,780,250 tons in May, against 2,395,056 tons in April and 2,518,400 tons in May, 1932. Recovery of light oils totaled 8,547,565 gals. in May, as compared with 7,328,871 gals. in preceding month and 7,706,384 gals. in May last year. Production of tar in May was placed at 25,578,300 gals. contrasted with 22,034,415 gals. in April and 23,169,280 gals. in May last year. Ammonium sulfate or its equivalent, output reached 32,626 tons, as against 28,106 tons in April and 29,554 tons in May last year. Stocks at by-product plants increased to 2,975,172 tons from 2,847,155 tons, with most of the increase occurring at merchants' plants. Stocks at the end of April were equivalent to 48 days' production at the current rate, compared with 51.6 days' at the end of April.

May Imports

May synthetic dye imports totaled 360,490 lbs., valued at $352,111, in comparison with 206,225 lbs., valued at $203,483, in May, 1932. Imports of synthetic aromatic chemicals in May were 39.5% smaller than those in May, 1933. Imports of color lakes were 144.1% larger. Imports of other fine coaltar chemicals were 33.2% smaller than those in May, 1932.

Imports

	1933 Lbs.	1933 Value	1932 Lbs.	1932 Value
January	314,878	$311,640	297,266	$259,558
February	365,144	369,829	429,298	367,154
March	267,890	257,626	482,545	410,865
April	232,741	229,078	300,144	259,425
May	360,490	352,111	206,225	205,483
Totals	1,541,143	$1,520,284	1,715,478	$1,500,485

Countries of Origin

	Percentages 1933	Percentages 1932
Germany	67.37	68.51
Switzerland	29.97	28.82
England	2.63	2.08
All other	.03	.59

Imports of Medicinals, Photographic Developers, Intermediates and Other Coaltars

	1933 Lbs.	1933 Value	1932 Lbs.	1932 Value
January	55,087	$40,480	38,622	$26,401
February	137,144	97,944	108,219	80,715
March	177,781	52,000	87,479	63,690
April	179,065	60,366	92,067	72,609
May	90,056	67,574	134,789	31,675
Totals	639,131	$318,454	461,176	$275,090

Important Imports in May

(A total of 114 products including two groups, "synthetic resins" and "photographic chemicals," was specified in the list of imports.)

	Lbs.
Diazo salt G	7,066
Katanol W	5,950
Benzanthrone sulfide	4,721
Paratoluidin	4,577
Variamine blue salt B	3,990
Chloroaminophenolsulfionic acid	3,142
Metacresol	3,020
Chloroparaxylolthioglycolic acid	2,888
Kollamine	2,867

Tariff Commission Reports

U. S. Tariff Commission has just released statistics showing: (1) A total production of 71,269,445 lbs. of coal-tar dyes in 1932 and total sales amounting to 73,591,374 lbs. valued at $32,944,131, or a 15% decrease in production, 14% in sales quantity, and 15% in sales value as compared with 1931. Production of unclassified and medicinal dyes increased about 82%, while all other groups show decreases.*

Foreign Dyes

British dye manufacturers produced 49,380,266 lbs. of synthetic colors in 1932. This compares with 48,621,073 lbs. in 1931 and a record of 55,785,032 lbs. in 1929.

	Pounds
Acid wool colors	9,377,931
Basic colors	2,899,150
Cellulose acetate rayon colors	1,265,775
Chrome and mordant colors (including alizarins)	6,568,683
Direct cotton colors	7,581,162
Dyestuffs for lake-making	1,735,901
Oil, spirit, and wax colors	811,611
Sulfur colors	7,602,416
Vat colors (including indigo)	7,482,154
Unclassified colors	4,055,483

The 1932 production as to colors:

	Pounds
Blacks	13,839,225
Blues	10,337,399
Browns	3,579,085
Greens	1,789,876
Oranges	2,480,778
Reds	8,322,736
Violets	1,525,690
Yellows	3,788,115

Swiss Society of Chemical Industry reports that it manufactures 70% of its dyes in branch plants. Dyestuffs manufactured in Basel plant in 1913-1914 amounted to 4,580,000 kilograms and in 1932 to 3,700,000 kilograms. Production has a much higher value than that of 1913-1914. Total production of Basel plant and plants abroad in 1913-1914 amounted to 5,440,000 kilograms and in 1932 to 12,500,000 kilograms."

British Cotton & Wool Dyers' Association complains prices of dyes and chemicals have advanced, and competition prevents passing higher cost on to consumers.

Canadian imports of coal-tar dyestuffs in fiscal years ended March 31 amounted in 1932 to 3,315,686 lbs., valued at $2,080,141, and in 1933 to 3,033,331 lbs., valued at $2,029,704. Imports from U. S. and United Kingdom compared as follows—

	1932-3 Lbs.	1932-3 Value	1931-2 Lbs.	1931-2 Value
U. S.	1,240,127	$820,093	1,726,936	$989,090
U. K.	887,625	208,942	263,588	163,957

I. C. I. Statement

Statement made by Orlando F. Weber in his letter to stockholders of Allied June 14, referring to Imperial Chemical Industries, Ltd., as a "Government subsidized British chemical trust," is officially denied.

Imperial Chemical Industries, Ltd. states that at no time has subsidy been received from the British Government either by the company itself or by any of its subsidiary or associated companies, nor has the British Government any investment in any of the foregoing companies.

One zinc company is reported to have turned down orders because of full schedule.

*Copies available through Chemical Section, Tariff Commission, Washington.

Solvents

Solvents Buys Rossville

Commercial Solvents has entered into an agreement to purchase from Rossville Alcohol latter's industrial alcohol business, New Orleans plant, plant of the California subsidiary, and certain current and working assets of the corporation and its subsidiaries, including inventories. Consideration to be paid by Commercial Solvents to Rossville is 105,000 shares of Commercial Solvents stock and cash in the amount of the book value of the current and working assets to be sold.

Agreement is outlined in a letter which has been sent to Rossville stockholders by H. I. Peffer, chairman of the board of Rossville. Assets of Rossville and its subsidiaries not covered by the agreement with Commercial Solvents comprise principally cash, notes and accounts receivable and plants at Lawrenceburg, Ind., and at Carnegie, Ohio, and certain other facilities which may be adaptable to the manufacture and sale of alcoholic beverages.

It was pointed out that the proposed sale of assets of Commercial Solvents requires approval by holders of a majority of the preferred stock and common stock of Rossville, for which a special meeting of stockholders has been called for July 18.

It is understood holders of a majority of the common stock of Rossville have indicated they will vote in favor of the proposed sale if, and only if, the holders of substantially all of the preferred stock will presently consent to accept on any further distribution of the assets of the corporation, $10 in cash and one-half share of Commercial Solvents stock per share of preferred stock, in lieu of the stated distributive value of the preferred stock.

Commercial Solvents Corp. has outstanding 2,530,255 common shares of an authorized issue of 3,000,000 shares. On Dec. 31, 1932, company held 37,725 shares of common stock in its treasury.

Petroleum Solvents Higher

While the speeding up of production schedules in the automotive field to a point comparable with 1931 and a generally better situation in other lines consuming solvents in large quantities improved the demand, very few price changes were reported. Methyl acetone was stronger and advanced sharply. Petroleum solvents were a bright spot in the market picture, registering three separate advances in the last three weeks of the month. One reason for such strength was undoubtedly anticipation of immediate increases in crude prices in the East Texas field and another was the strong possibility that the oil industry will receive early attention from the administrators of the National Recovery Act and that the wild, unbridled, and ruinous competition of the past two years will be corrected shortly.

Important Price Changes

Methyl Acetone, drums c.l.	$0.54	$0.40
L.c.l., drums	.56	.44
Petroleum Solvents, group 3		
Cleaners Naphthas, tanks	.05¾	.05
Lacquer Diluents, tanks	.07	.06¼
Petroleum Thinners, tks.	.04½	.03¾
Rubber Solvents, tanks	.05¾	.05
Stoddard Solvent	.05¼	.04½
V.M. & P. Naphthas	.04¾	.04

R. & H.'s New Solvent

Non-inflammable and non-explosive fluid for dry-cleaning purposes, "Triclene," is now in large quantity production by R. & H. Chemicals Dept., du Pont. A large market has been developed among commercial dry cleaners. It is not at present offered in retail trade.

Laboratory and service tests show that this fluid readily dissolves fats, waxes, oils, pitch, gums, chewing gum and tar, and is also effective in removing from fabrics many stains that were considered only water-soluble. Among other advantages claimed for "Triclene" is that its use restores original appearance and feel of fabrics and also that there is no weakening of fabrics or shrinking, while garments or materials cleaned with it are free from odor.

U. S. I.'s Westwego, La. plant lost 1,000,000 gals. of denatured (value $350,000) when large storage tank was struck by lightning June 25.

Anderson-Prichard Refining is sued by Texas Co. on alleged infringement of Behimer patents.

Anderson-Pritchard Oil moved research laboratory to 3921 Ravenswood ave., Chicago. Activity has been doubled in past year. Division was started in November, 1929.

Metals and Alloys

New Tin Markets

Organization of Tin Research & Development Council by International Tin Committee as means of finding new markets and consolidating existing ones, announced in this country and in London.

Spectacular Rise in Metals

The advance in the metals in the past 30 days has been nothing short of spectacular. While increases in business activity are making larger demands and therefore reducing stocks, nevertheless it is felt that two other factors—uncertainties in international exchange and a certain amount of speculation, are also largely responsible for the strong price position of all of the metals. For metals such as copper, zinc, lead, and silver, an additional factor of the Recovery Act also enters.

World production of zinc in May totaled 85,693 short tons, against 81,764 tons in April, and 74,128 tons in May, 1932, according to American Bureau of Metal Statistics. U. S. production totaled 21,730 short tons, against 21,449 tons in April.

Daily average world output in May was 2,764 tons, compared with 2,725 in April 2,708 in March and 2,391 tons in May, 1932. World production of zinc for first five months was 406,248 tons, compared with 386,432 in the first five months of 1932.

Following table in short tons gives output of the various countries for recent months together with total for first five months of 1933:

	Apr.	*May*	*Jan.-May*
United States	21,449	21,730	105,178
Mexico	2,536	2,744	13,185
Canada	6,705	6,945	33,868
Belgium*	11,429	12,125	54,868
France	5,289	5,567	26,759
Germany	4,261	4,526	21,465
Italy	2,011	2,211	9,827
Netherlands	1,598	1,605	7,577
Poland*	6,797	7,546	35,454
Rhodesia	1,882	1,854	8,217
Spain	735	754	3,983
Anglo-Australian	8,272	8,886	41,767
Elsewhere†	8,800	9,200	44,100
World's total	81,764	85,693	406,248
United States	21,449	21,730	105,178
Elsewhere	60,315	63,963	301,070
Stock at end:			
United States	142,447	136,634	.....
Cartel report	158,348	151,683	.....

*Includes salable zinc dust. †Partly estimated; includes Norway, Jugoslavia, Czechoslovakia, Russia, Indo-China and Japan.

Important Price Changes

Antimony	.06½	.06¼
Copper	.08½	.07¼
Lead, spot, E. St. Louis	4.15	3.60
Silver	.36¾	.33¼
Tin	.46½	.41⅜
Zinc, spot, E. St. Louis	4.60	4.00

Lead Figures

World production of refined lead in May totaled 100,013 short tons, against 99,539 tons in April and 115,027 tons in May, 1932, according to same authority U. S. production in May totaled 19,405 short tons against 23,385 tons in April. Average daily lead production of the world in May was 3,226 short tons compared with 3,318 tons in April and 3,711 tons in May, 1932.

World lead production for first five months of 1933 was 506,208 tons compared with 568,538 tons in first five months of 1932.

Following table in short tons gives output of lead for the various countries

allocated so far as possible to country of origin of the ore:

	April	May	Jan-May
United States	23,385	19,405	112,122
Canada	10,262	10,697	49,327
Mexico	6,268	10,499	45,216
Germany	10,318	10,472	50,990
Italy	2,006	1,544	7,687
Spain and Tunis	†10,570	8,340	49,387
Europe, n.e.s.*	9,200	11,500	53,300
Australia	17,748	18,346	88,383
Burma	6,782	6,810	33,696
Elsewhere*	3,000	2,400	15,100
World's total	†99,530	100,013	506,208
Other than U. S.	†76,154	80,608	394,086

*Partly estimated.. †Revised

For the first time in two years there is a demand for drill rigs to explore for zinc and lead in the Tri-State field.

Ordered Liquidated

Federal District Court for Western District of Pennsylvania has ordered liquidation of U. S. Chromium Corp.'s assets and acceptance of offer of $6,350 for personal property made by N. H. McKay.

Foote Mineral, 1609 Summer st., Philadelphia, has issued a copy of an original article on thallium by Dr. James C. Munch. Descriptions are given of the uses of thallium in pigments, catalysts and other chemical uses. Copies available

Naval Stores

Rosin Prices Go Higher

Rosin prices moved higher in both the primary markets and locally, particularly prices of the lower grades, continuing a movement which started two or three months ago. In contrast was the rather sluggish state of the turpentine market. The close at the end of June at Savannah was actually slightly under the close on May 31.

For May the foreign movement of spirits turpentine included 21,366 barrels gum and 2,008 wood, a total of 23,374 barrels. Of rosin the exports in May were 84,467 gum and 19,827 wood, a total of 104,294 barrels. The following shows the exports for five years:

Spirits Turpentine (Bbls. 50 gals.)

Year	May	April-May
1933	23,374	42,100
1932	19,930	38,873
1931	11,630	24,319
1930	33,278	46,149
1929	32,321	48,357

Rosin (Bbls. 500 lbs.)

Year	May	April-May
1933	104,294	193,023
1932	83,242	187,080
1931	76,595	161,602
1930	139,799	222,961
1929	121,588	200,861

Rosin prices at Savannah on June 30 compare with the lowest figures for the season 1932-1933 as follows:

Grades	1933 June 30	Lowest 1932-33
WW	$4.05-10	$3.60
WG	3.90-95	3.55
N	3.80-85	3.30
M	3.70-80	2.90
K	3.70-75	2.20
I	3.65-75	2.15
H	3.65-75	2.10
G	3.65-75	2.07½
F	3.65-75	2.05
E	3.65-75	2.00
D	3.45-50	1.65
B	3.25-40	1.45

Still Returns

Carson Naval Stores, Savannah and Jacksonville, reports average net returns to producer at still shows a very substantial increase for May over April, net returns per unit, of one barrel spirits turpentine and three and one-third barrels of rosin, have gone up from $29.97 to $36.27, an increase of $6.30 per unit or 21%. For two months April-May net returns were $34.23, against $30.21 for those two months last year, an increase of $4.02 per unit for the two months, or over 13%.

May production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand May 31, according to data producers' committee, Arthur Langmeier, Hercules Powder, secretary:

Production

	Rosin 500-lb. barrels	Turpentine bbls. 50 gallons	Pine oil Gallons
Month of May	31,045	5,028	208,133
Total from April 1, 1933..	55,971	8,859	392,893

Stocks at Plants

Total, May 31, 1933	70,934	6,981	.....
Mar. 31, 1933	98,615	12,387	.....
Change	—27,681	—5,406	.....

Note—Rosin production and stocks include all grades of wood rosin.

H. M. Peagler, Jr., 25, operator of a turpentine plant at Waycross, Ga., was robbed and murdered June 6. . . . Herbert H. Gordon, 64, well-known figure in Southern naval stores field, died June 3 at McGregor, Ga.

Newport (General Naval Stores), Pensacola, Fla., has resumed operations at its Bay Minette, Fla., plant, employing about 100 men. Company's plants at Pensacola and DeQuincy, La., are also being operated at capacity.

Spanish Exports

Spanish naval stores exports during first quarter were 323,997 gals. of turpentine (500,751 gals. in 1932 quarter) and 2,209 metric tons of rosin (4,777 tons last year). Belgium and Italy were biggest buyers of turpentine; Great Britain and Germany bought most rosin.

John H. McCormack, vice-president, Newport Industries, Pensacola, Fla., was in Chicago in the last week of June for a conference with P. E. Calo, General Naval Stores vice-president.

German imports of naval stores from U. S. during the first 11 months of 1932 were as follows (comparable figures for 1931 in parenthesis):—Turpentine, 9,681 metric tons (11,011 tons); rosin, 36,510 tons (33,871 tons). Imports from all sources in the 1932 period were 15,574 tons of turpentine and 47,438 tons of rosin.

Recovery Act

Policy of the industry is gradually being evolved according to *Savannah Weekly Naval Stores Rreview*, with regard to participation in recovery. Among producers and factors there is a discussion of means that are to be adopted to line up the industry under the recent national legislation and put itself in a position to obtain any benefits that may be desired from the operations of the government plans. In the last week of the month another meeting of factors was held at Brunswick to discuss questions arising from government's policies and determine as far as is possible at this time course that should hereafter be pursued, it having been decided at previous meetings that the interests of the industry lay under the Farm Act and not the act to govern industries.

At the Brunswick meeting were present H. M. Wilson, Turpentine & Rosin Factors, Inc.; E. M. Sessoms, Consolidated; H. Wiebert, Peninsular N. S. Co.; H. L. Kayton, Carson N. S. Co.; O. T. McIntosh, Southern States N. S. Co., and Millard Reese, Downing Co. Meeting was devoted to a further study of the law and of the best course for the industry to adopt. The result was a resolution under which Mr. Wilson, as chairman, will appoint a committee at the proper time to go to Washington to ascertain from the officials there exactly how far the industry can go in cooperating for the conduct of business and the promotion.

It is reported that the general concensus of opinion was that the pivotal point around which any use of the privileges accorded under the Farm Act must revolve is the power to regulate production. If prices do not advance in keeping with other commodities, and in keeping with the increased cost of production, there are certainly those who would favor some measure of reduction of the present crop, such as has been done with regard to cotton.

At a recent meeting of producers of naval stores by the steam and solvent process held at Birmingham, Ala., to form an association and adopt a code to apply to operations under the provisions of the National Recovery Act, a tentative constitution and set of rules was discussed and a committee appointed to bring the matter before the trade for permanent action in the near future.

Paints, Lacquers and Varnish

Paint Sales Rise Sharply

Paint sales, lagging behind general business in March, April, and part of May, suddenly have shot up at a greatly accelerated pace, with the result that raw materials are in greater demand. Lead pigments have provided the most news in the past 30 days with two ¼c advances, the last being announced July 6.* Casein is another item exhibiting specially strong tendencies. Argentine material has recently been quoted on a par with domestic grades. Stocks are scarce and in some quarters it was reported that higher prices might be reached before the situation is eased by larger quantities becoming available.

Strength in Flaxseed

Several important developments in the past month have combined to produce one of the strongest situations in flaxseed and linseed oil for a good many years: (1) the hot dry weather in the Northwest; (2) a reduction in estimates of the remaining surplus in the Argentine; (3) a decline in domestic flaxseed receipts; (4) a sharp improvement in the demand for linseed oil.

Gradual improvement of prices in the Northwest brought out more domestic flaxseed during the past two months than was at first expected. However, it is understood that loadings from the country are decreasing quite rapidly. Domestic prices—up over 7c a bushel—now stand at the highest figure seen since October 1930.

Most linseed oil buyers have apparently become aware of the acute shortage of flaxseed supplies and there has been a great scramble for oil reported during the past few weeks. Oil for prompt shipment is very scarce and selling at a premium.

*See page 33. Lead Pigments.

Important Price Changes

Casein, dom. coarse	.12½	.10½
Casein, fine	.13	.12
Lead Pigments		
Red lead	.07¾	.07¼
Litharge	.06¾	.06¼
Orange Mineral	.10¼	.09¾
Shellac, T. N.	.13½	.12½
Superfine	.14½	.13½
Bone dry	.22	.20
Varnish White, 4 lb.	1.10	1.05
Orange 4 lb.	.85	.80
Talc, French	20.00 Nom	18.00
Italian	55.00 Nom	45.00
Terra Alba, imp.	27.50	25.00

Indicative of the better feeling in the paint field Devoe & Raynolds, Sherwin-Williams, and Glidden have advanced prices 5 to 20c a gallon. This advance which is between 7 and 10%, is a reflection of the recent upswing in raw materials prices; National Lead sales in May were 50% greater than the average for the first quarter of 1932.

Deaths

Roy B. Robinette, 55, former N. P. O. & V. Association head (1926), and officer of Tropical Paint & Oil, Cleveland, died June 7 of a heart attack. He was prominent in Cleveland paint clubs and civic organizations.

Garret H. Demarest, 59, formerly connected with C. A. Wiley, Long Island City, for 25 years a prominent Queens Mason, died June 6 at his home in Flushing, L. I.

George G. Roberts, 68, reputed inventor of non-shatterable glass, died in Washington recently.

Caldwell Riggs, 50, assistant treasurer and director of United Carbon, died June 16 at Charleston, W. Va.

Club News

J. Clair Evans, Denver Fire Clay Co., was elected president of the Paint, Oil and Varnish Club of Colorado. Other officers are: R. J. Foley, Sherwin-Williams, vice-president; H. M. Barton, Mountain & Plain Paint, treasurer, and A. G. Hardy, Pittsburgh Plate Glass secretary.

Northwestern Paint and Varnish Production Club, of St. Paul and Minneapolis, elected "Ed" Marvin, Minnesota Linseed Oil Paint Co., of Minneapolis, president.

Cleveland Paint & Varnish Production Club officers who take charge this fall include: President, R. C. Starck, Pratt & Lambert; vice-president (re-elected), C. M. Hayes, Ferbert-Schorndorfer; secretary, (re-elected); E. Edelstein, Benjamin Moore; treasurer, Dr. C. G. Moore, Glidden. Women for the first time will be permitted on fall outing.

On June 2, Cleveland Paint Club played golf and elected following officers: Clifford Foss, president; vice-president, S. C. Wagenman; secretary and treasurer, N. W. Putnam. On June 30 golfers played Pine Ridge Country Club course.

Philadelphia Paint and Varnish Production Club, June 1, elected following officers:—President, Dr. C. A. Knauss; vice-president, R. C. Rollins; secretary, George P. Woodward; treasurer, W. R. Horack. Mr. Rollins later resigned as he is leaving Philadelphia, where he was chemist-superintendent for Hoch Paint & Chemical Wks., to locate in Baltimore with Miller & Graham.

Appointments

Schaefer Co., Louisville varnish and lacquer company has appointed Todd Cunningham, Ft. Smith, Ark., representative in Southwest to fill vacancy caused by death of Toney Carter. New sales representation for the South will also be named shortly.

Mayhew W. Tronson elected president of Payson Varnish, N. Y. City, to fill vacancy caused by recent death of Horace E. Payson.

National Lead is represented on the new Commodity Exchange by A. B. Hall; Benno Elkan represents International Minerals & Metals Corp.

Encouraging News

Encouraging indications are to be found in the recently published "Dodge" figures covering residential building for the month of May. Figures for 37 states showed that the May contracts totaled 8,362,000 square feet as compared with 5,800,000 in April and 6,700,000 in May of last year. June is expected to have considerably bettered this record.

Pittsburgh Plate Glass has started construction on plant for its Pacific coast division.

Sherwin-Williams' president, George A. Martin, reports price advance June 19 averaging around 7½%. This brings

April Coating (Lacquers, Varnish, Paint) Sales*

Sales of lacquer, varnish and paint products in April totaled $20,295,011 in value, according to a preliminary report by U. S. Bureau of Census (588 establishments) April sales were the best of any month since May last year, and compared with a revised total of $14,431,360 in March, and $22,612,193 in April, 1932.

		Classified sales reported by 344 establishments				*Unclassified sales reported by 244 establishments*
	Total sales reported by 588 establishments	*Industrial sales*			*Trade sales of paint varnish and lacquer*	
		Total	*Paint and varnish*	*Lacquer*		
1933—January	$11,946,271	$3,529,916	$2,386,977	$1,142,939	$4,163,960	$4,252,395
February	12,345,600	3,417,387	2,439,732	977,655	4,767,355	4,160,858
March*	14,431,360	3,384,766	2,477,369	907,397	5,794,823	5,251,771
April†	20,295,011	4,664,267	3,130,761	1,533,506	8,633,276	6,997,468
1932—January	15,894,506					
February	16,270,822					
March	19,089,005	Comparable statistics not available				
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November	13,260,328	3,599,319	2,639,362	959,957	5,196,766	4,464,243
December	10,127,780	3,222,770	2,186,706	1,036,064	3,506,715	3,398,295
Tot., year	$204,734,085	.....	.....	.....	.....	.....
1931—Total	278,442,170	.....	.....	.....	.....	.....

*Revised. †Preliminary.

Quarterly Lacquer Statistics (Jan.-Mch.)

Sales of lacquers during first quarter of 1933 were 3,866,821 gals. against 3,532,718 gals. in final three months of 1932, according to preliminary figures compiled by the Bureau of Census, (102 identical manufacturers). Sales in first quarter of 1932 were 4,666,420 gals.

	Total sales		*Finished lacquer*		*Lacquer thinners*		*Dopes**	
1933	*Gals.*	*Value*	*Gals.*	*Value*	*Gals.*	*Value*	*Gals.*	*Value*
First quarter‡..	3,866,821	$5,291,498	1,870,199	$3,629,898	1,772,274	$1,408,524	224,348	$253,076
1932								
First quarter†..	4,666,420	6,947,508	2,249,069	4,692,055	2,161,317	1,913,937	256,034	341,516
Second quarter†	4,475,293	6,867,544	2,337,612	4,823,513	1,968,189	1,796,301	169,492	247,730
Third quarter†.	3,578,390	5,382,948	1,778,305	3,593,977	1,601,875	1,515,330	198,210	273,641
Fourth quarter†	3,532,718	5,140,226	1,836,432	3,524,739	1,499,002	1,341,175	197,284	274,312
Totals, year.	16,252,821	24,338,226	8,201,418	16,634,284	7,230,383	6,566,743	821,020	1,137,199
1931								
First quarter†..	5,622,337	9,504,887	2,835,390	6,524,744	2,565,008	2,602,506	221,939	377,637
Second quarter.	6,712,289	10,966,421	3,265 744	7,399,231	3,153,427	3,038,561	293,118	528,629
Third quarter..	5,515,026	8,641,603	2,727,951	5,791,264	2,521,764	2,456,265	265,311	394,074
Fourth quarter.	4,586,663	7,223,112	2,352,524	5,012,044	2,030,906	1,902,364	203,233	308,704
Totals, year.	22,436,315	36,336,023	11,181,609	24,727,283	10,271,105	9,999,696	983,601	1,609,044

*Does not include base solutions used in the manufacture of lacquers.
†Revised.
‡Preliminary.

house paint prices to 1916 levels. On June 19, 1932, a cut of 15% in prices was made.

J. Paul Nolan, Pratt & Lambert purchasing agent, was elected vice-president National Association of Purchasing Agents, in charge of Eighth district.

Industry News Items

Patrick H. Callahan, Louisville Varnish president, was the principal speaker on the June 17 program of the "Century of Progress . . . Baltimore Paint, Oil & Varnish Club at annual meeting June 20 heard President Matlack. Visitors included Dr. Harry Gardner, well-known shellac research worker at Brooklyn Poly; Acting Manager MacFadden, N.P.O. & V. Association; Samuel Davis, Geo. D. Wetherell; Washington Paint Club president, Hugh Riley, Jr and Otto Milletti, Charles R. Long, new entertainment committee head of the Louisville Paint Association, has set July 14 as the tentative date for the annual golf tournament at the Big Springs Golf Club . . . On June 16 the Louisville Paint, Oil & Varnish Association met with the Louisville Production Club at the Audubon Country Club and heard Leo Roon, Nuodex Products speak on the so-called "foolproof" driers . . . S. H. Clark, president of Whittaker, Clark & Daniels, flew to California, June 24, to visit some of the company's Pacific coast principals . . . Arthur R. Curphey, Patterson-Sargent purchasing agent, is ill and under a doctors care in Michigan . . . Henry M. Toch, president of Toch Bros., and chairman of board of Standard Varnish, died at 70 at home in N. Y. City on July 1.

Oils and Fats

Oleomargarine Bill

Under terms of a bill introduced by Rep. Knutson, sale of oleomargarine containing less than 75% of animal fat would be prohibited. Measure provides that "no oleomargarine manufactured or processed wholly or in part after six months after date of enactment shall be knowingly sold or offered for sale for immediate or ultimate domestic consumption or use unless such oleomargarine contains at least 75% of animal fat by weight. Crushing for 10 months of the cotton year ended with April totaled 4,286,077 tons, against 5,124,789 tons in corresponding period of preceding year.

Receipts at mills during period were 4,434,977 tons, against 5,517,180 tons, and stocks on hand May 31, were 447,896 tons this year, against 400,375 tons a year ago.

Cottonseed products manufactured during period from August 1 to May 31, it was reported, included 1,337,271,231 lbs. of crude oil, against 1,624,387,547 lbs. in the corresponding period of the preceding cotton year; 1,144,818,411 lbs. of refined oil, against 1,396,832,766 lbs.; 1,938,871 tons of cake and meal, against 2,307,690 tons; 1,220,079 tons of hulls, against 1,448,746 tons; 679,997 running bales of linters, against 836,215 bales; 17,473 500-pound bales of hull fiber, against 32,772 bales, and 24,203 500-pound bales of grabbots, motes, etc., against 30,066 bales.

Important Price Changes

Advances	
Chinawood, bbls.	$0.07¾
tanks	.07⅜
Coast, tanks	.07
Corn, crude, tanks	.05⅛
Linseed, tanks	.101
c.l., bbls.	.107
Neatsfoot, cold pressed	.16½
Extra	.08¼
Olive oil, foots	.05½
Peanut, tanks	.05
Perilla, Coast, tanks	.08½
Red Oil, tanks	.06
Soybean, tanks	.07½
Tallow, acidless, tanks	.07¼
Declines	
Coconut, Ceylon, bbls.	.04½
Coast, tanks	.03

$0.06⅜
.06
.05½
.04¾
.088
.094
.16
.08
.05¼
.04¾
.07
.05¾
.06
.07
.04⅝
.03⅛

Archer-Daniels' Business Increases

Archer-Daniels-Midland's President, Shreve Archer, states that in current quarter to end June 30 company will exceed its total earnings for preceding three quarters. In latter period company earned 82c per share, of which it paid out 75c in three quarterly dividends.

Mr. Archer adds: "Every division of our business now is in the black. Our products are so diversified and reach so many lines that we were in a position to benefit from any material turn for the better. Foreseeing this we felt that we had made every preparation but the comeback has been even stronger than we had anticipated."

Glidden Buys Van Camp

Glidden has purchased business, plants and inventories of Van Camp Products and the Van Camp Oil, Louisville, Ky. These plants fully equipped to produce shortening and edible oil products, will be operated by Durkee Famous Foods, Inc., Glidden subsidiary.

Vegetable oil refinery has a capacity of 160 tank cars of cottonseed oil a month and the shortening glant a monthly capacity of 1,500,000 lbs. of shortening. Hydrogenizing plant produces 500,000 lbs. of salad oil monthly.

Tung Oil Exports

Exports of tung oil from Hankow, in April totaled 10,904,000 lbs. compared with 4,358,000 lbs. in March, shipments to the U. S. amounting to 8,768,000 lbs. against 1,694,000 lbs. Shipments in April, 1932, were 8,142,000 lbs., of which 6,008,000 were for U. S.

Gain in April, both as compared with preceding month and with previous year, was due to heavier American takings, shipments to Europe for the month being 2,136,000 lbs. against 2,664,000 in March and 1,906,000 in April, 1932.

Trade estimates of tung oil production in China credit four leading provinces with the following amounts:

	Tons	
	1931	*1929*
Szechwan	39,990	36,650
Hunan	33,325	33,350
Hupeh	19,990	20,000
Chekiang	17,329	13,500
Totals	110,634	103,500

Spencer Kellogg Promotions

Victor A. Acer, Spencer Kellogg & Sons' sales manager for more than 10 years has been made vice-president; Robert C. Boggess, N. Y. City manager, is now sales manager with headquarters in Buffalo. Mr. Boggess is succeeded by former Cleveland manager, Alfred P. Mason, Charles E. Lacey takes over Mr. Mason's former duties.

Association Notes

P. J. Lemm is the new president, Texas Cottonseed Crushers' Association. He is secretary-manager, Brenham Cotton Oil

& Mfg., Brenham, Tex. B. B. Hulsey, manager, East Texas Cotton Oil, Terrell, Tex., is vice-president.

Oil Trades Association of N. Y. annual outing at Pelham, June 22 was attended by "Cliff" Withman, Smith-Withman Oil; "Bob" Horgan, Frey & Horgan; "Ed" Nielson, vice-president, American Mineral Spirits.

American Soybean Association is meeting at Lousiana State University, Baton Rouge, La., Aug. 3-4.

Oklahoma Cottonseed Crushers' Association held its 24th Annual Convention at the Artesian Hotel, Sulphur, Okla., Monday and Tuesday, June 26 and 27, 1933.

M. K. Thornton, Jr., professor of industrial chemistry, A. & M. College, College Station, Texas, discussed "Interesting Experiments in Oil Milling."

Ed. Woodall, secretary, Texas Cottonseed Crushers' Association is ill.

Company News

Steamer Virginia, Inc., Reedville, Va., has been chartered to deal in fish and manufacture fish and meal fertilizer. R. P. Waller, Fleeton, Va., is president.

Will & Baumer has booked considerable tonnage for delivery after Sept. 1 and plant is again on a five day week.

California Packing, San Francisco, will operate sardine oil and meal plant for first time in two years. Corporation's plant at Vancouver Island, B. C., has been leased to Nelson Bros. Fisheries, Vancouver.

A. S. Vera Fabrikker, Norwegian, is now producing linseed at Sandefjord.

Baker Castor Oil is installing new Westinghouse boiler units at Bayonne.

Gums, Waxes, Shellac

Important Price Changes

Aloes, Barbadoes	.90	.85
Arabic, white sorts	.15	.13
Amber sorts	.07¼	.06¾
Batavia damar, E. I.	.12½	.11
Copal M. A. sorts	.06	.05½
Gambage, pipe	.52	.50
Karaya	.07	.06
Myrrh	.20	.18
Pontianak chips	.06	.05½
Singapore, No. 1	.14½	.13
No. 2	.11	.09¼
No. 3	.06	.05
Tragacanth, No. 1	.75	.65
No. 2	.65	.53
No. 3	.50	.40

Stabilization and Prices

Opinions differ when interpretations are expressed over President Roosevelt's sudden pronouncement to the London Economic Conference. Certain it is, however, that one effect was a further strengthening in prices here of materials largely imported and, of course, most of the gums and waxes fall in this group. Also, in the first week in July shellac factors despite extremely light forward buying, raised quotations sharply on all grades giving as a reason the now familiar story of higher replacement costs in the primary markets abroad.

Carnauba suddenly turned particularly strong when spot stocks became almost unattainable due to the delay in the S. S. Benedict in arriving from South America with stocks taken aboard from the S. S. Basil which was disabled early in the month. The varnish gums, particularly tragacanth, were very strong due to the small spot stocks available to meet the greatly increased demand from the varnish trade.

Quaker Chemical Products, Conshohocken, Pa., have applied for patent on new oil product that can be added to Paraffine Wax, Japan Wax, Carnauba Wax, Montan Wax, Ceresin Wax, and Ozokerite Wax to make them water soluble. With some of the waxes dispersion is so fine that there is no separation of solid wax in long water dilutions.

Hydrowax Latest Glyco Product

Hydrowax, produced by Glyco Products, Brooklyn, is now being used to coat rubber, giving, it is said, a glossy shiny surface, less likelihood of "sun-cracking." It reduces sticking of sheet goods, soiling and surface decomposition. Also surface pores are sealed. It is also used on leather, artificial leather, cement, or composition products of a porous nature.

Important Price Changes

Bees, white pure	.32	.30
Candelilla	.09½	.09
Carnauba, flor	.32	.25
No. 1 Yellow	.30	.26
No. 2 N. C.	.18	.14
No. 3 Chalky	.13	.12½
No. 3 N. C.	.13	.12½
Japan Wax	.06½	.05¾
Spermaceti, blocks	.19	.17
Spermaceti, cakes	.20	.18

Standard Varnish Personnel

Standard Varnish has appointed Jesse M. Aaron as vice-president in charge of all sales. Mr. Aaron has been identified principally with the Toch Brothers division. Company has also made a number of other changes in personnel. Harrie S. Bickford has been made sales manager for N. Y. trade sales division. He has been with company 16 years, greater part of which has been spent in Chicago. Miss Diane Adler has been appointed advertising manager. In Chicago division, E. E. Day has been elected vice-president and general manager of the Standard Varnish Works of Illinois; E. O. Robso becomes sales manager of the industrial department, Walter Barden sales manager of the Toch department, and E. M. Stickley becomes sales manager of the trade sales department.

Parks Dies

Edward W. Parks, 42, superintendent of the E. S. Parks Shellac Co., died June 28 at his home in Fall River, Mass. He was born in Danbury, Conn., the son of Edward S. and Cora W. Parks, but had lived in Fall River since he was 10 years of age. He was a 32nd degree Mason.

Late News

Mathieson Alkali, July 11, announced purchase of Beaver Products (Gypsum Producing Co., of Certainteed Products).

Cottonseed Statistics

Cottonseed products manufactured, shipped out and held in period Aug. 1 to May 31, 1933 and 1932, as reported by Bureau of the Census.

	On hand Aug. 1	*Produced Aug. 1 to May 31*	*Shipped out Aug. 1 to May 31*	*On hand May 31*
Crude oil, lbs.—				
1932-1933	*29,523,581	1,337,271,231	1,301,819,377	*81,279,178
1931-1932	8,086,071	1,624,387,547	1,566,314,324	85,134,000
Refined oil, lbs.—				
1932-1933	†628,420,148	‡1,144,818,411	.....	†779,446,874
1931-1932	277,836,530	1,396,832,766	.....	707,438,993
Cake and meal, tons—				
1932-1933	114,656	1,938,871	1,846,352	207,175
1931-1932	146,888	2,307,690	2,305,030	149,548
Hulls, tons—				
1932-1933	162,773	1,220,079	1,293,610	89,242
1931-1932	47,723	1,448,746	1,296,096	200,373
Linters, running bales—				
1932-1933	235,521	679,997	741,094	174,424
1931-1932	175,904	836,215	741,727	270,392
Hull fiber, 500-lb. bales—				
1932-1933	4,138	17,472	16,882	4,728
1931-1932	3,564	32,772	32,072	4,264

*Includes 4,182,006 and 13,265,139 lbs. held by refining and manufacturing establishments and 7,235,770 and 14,456,380 lbs. in transit to refiners and consumers August 1, 1932, and May 31, 1933, respectively.

†Includes 4,652,177 and 4,142,513 lbs. held by refiners, brokers, agents and warehousemen, at places other than refineries, and manufacturing establishments, and 5,598,691 and 3,674,285 lbs. in transit to manufacturers of lard substitute, oleomargarine, soap, etc., August 1, 1932, and May 31, 1933, respectively.

‡Produced from 1,245,953,681 lbs. of crude oil.

Exports for Nine Months up to April 30

		1933	*1932*
Oil, crude	lbs.	31,711,479	30,651,399
Oil, refined	lbs.	7,021,029	4,991,101
Cake and meal	tons of 2,000 lbs.	143,899	200,784
Linters	running bales	124,763	89,064

Textile Chemicals

The New Dyes

DuPont's dyestuff division is marketing Sulfogene Brown CL4R, a sulfur color which produces reddish brown shades of excellent fastness. It is described as being equal in strength to Sulfogene Bordeaux CF but very much bluer and noticeably duller. Although apparently similar to the sulfur bordeaux on account of its shade, it is distinctly not a dyestuff of this type. Sulfogene Brown CL4R is said to be very fast to acids, ammonia, light, washing and water and is also satisfactory for acetic acid cross-dyeing. It may be dyed on yarn or piece goods, and does not change shade a great deal through after-treatments.

General Dyestuff Offers

General Dyestuff has just issued releases on Indanthren Blue Green FFBA, a new dyestuff produced by General Aniline, which is primarily of interest to the cotton printers. The principal use of this dyestuff is for combinations with Algol Yellow GCA paste Fine to produce shades of green at a low cost.

General Dyestuff is also introducing (July 5) a new representative of the Alizarine Sky blue class—Alizarine Sky Blue FFB which is distinguished by its exceptionally bright shade, even under artificial light. It dyes level from a Glauber's salt acetic acid bath. Fastness to light is very good, in fastness to fulling, washing, water, salt water and perspiration it meets medium requirements. Fastness to rubbing, hot pressing, stoving, carbonizing and decatizing is very good. Alizarine Sky Blue FFB may also be used as a shading color for Chrome colors, although the shade is turned greener and duller by Chrome. On silk it produces bright blue shades of excellent fastness to light. (Bull. I. G. 735).

General Dyestuff has ready several new sample cards (1) illustrating results of Indanthren dyes for curtains and hangings, showing fastness to light; (2) a sample card with 168 dyeings upon carpet yarn; (3) card showing effects on both cotton and rayon in combination; (4) card showing results produced by diazo dyes of the I. G. on rayon discharged with Rongalite C.

New Ciba Colors

Ciba is marketing "Invadine C" new wetting out agent (produced by Society of Chemical Industry, Basle) important because it works best in neutral or acid solutions. Ciba is also marketing Green 4G Double Paste and Cibanone Green 5G Paste, two new vat dyes with specially good fastness to light.

Sandoz Chemical's latest dye offerings—Alzarine Light Brown BL—a wool brown; Omega Flavine CLG is a new chrome yellow, particularly suitable as a shading product in the dyeing and slubbing piece goods and yarns.

Carbic Color & Chemical has developed a Fast Indigosol Grey which fills a long felt deficiency in the Indigosol range. Hitherto, production of Grey shades with Indigosols was confined either to Indigosol Printing Black IB, the fastness of which, particularly in light shades, was not satisfactory or a combination of three of the faster Indigosols.

Association's

Albert L. Scott, president, Lockwood, Green Engineers, is president of National Association of Finishers of Textile Fabrics. Mr. Scott was chosen by finishers to administer details of the national industrial recovery act as they will be applied to finishing division.

Rhode Island section, A. A. T. C. & C., will hold July 14, at the Warwick Country Club, Providence, second annual outing and the program of events will include golf, tennis, swimming and dinner.

Percy S. Howe, Jr., Suncook Mills, is president of new group—National Rayon Weavers' Association.

Drysalters' Club held its summer outing June 23 at the Andover Country Club, Shawsheen, Mass.

Edward W. Croner is the winner of the Textile Color Card Association scholarship at Philadelphia Textile School.

Fall Color Cards

Textile Color Card Association, 200 Madison ave., N. Y. City, has issued "Color Coordination Guide to be used with 1933 Fall Season Hosiery Color Card of America." The 12 new hosiery colors for fall are classified in three basic merchandising groups, as Taupe Shades, Beige Shades, and Brown Shades. The new hosiery tones have been issued in the same practical form as the 1933 Spring hosiery shades (a "two-in-one" card), with generous size for tabs for a permanent color record and large loose-leaf swatches for dyeing purposes. Both card and booklet are available to members.

W. H. Furness, president; Raymond W. Baker, vice-president and general manager, Welsbach Co., and Maurice Praissman, were appointed permanent receivers of Furness Corp. rayon manufacturers, by U. S. District Court at Camden, N. J. They are authorized to operate.

DuPont's latest issue of the *du Pont Magazine* contains an article on "Gardinol"—sulfonated fatty alcohols—for replacing soap in textile operations.

In New Surroundings

Personnel changes include C. R. Gosman now in charge of dyeing at Thread Mills, Monticello, Ind.; William E. Rowlandson, Jr., in charge of dyeing at Robinson Mfg., Oxford, Me.; P. J. Arran overseer of finishing at Slingsby Mfg., Brantford, Ont.; Herman Cook in charge of finishing at Cascade Woolen, Oakland, Me.; W. George Bleackley in charge of finishing at Southbridge Printing, Southbridge, Mass.

M. I. T. Summer Course

Textile Microscopy, Textile Technical Analysis, and Textile Laboratory are special summer courses being offered again at M. I. T by Prof. E. R. Schwarz. Work begins July 26 and ends Sept. 6.

Personal

Pasquale Porraro, president of Kapo Dyeing & Printing Wks., Haledon, N. J., Trio Dye Wks. and American Dye Wks., sailed recently on the *Rex* on a business trip to Europe.

Fred S. Klebart, technical textile director for J. B. Ford, was in New England most of June.

German Dye Exports

Exports of coal-tar dyes from Germany showed a downward trend during first four months of this year. Total was 9,140 metric tons, valued at 44,209,000 marks, compared with 10,678 tons, valued at 49,916,000 marks, exported in the first quarter of 1932.

Shipments of anilin dyes to the Orient have shown a marked decrease this year. This was especially marked with respect to British India, which took 1,905 metric tons in the first four months of 1932 and only 433 tons in the corresponding 1933 period. Exports to China dropped from 1,458 tons to 1,282 tons. In general, exports to Continental European markets were well maintained, some countries showing increases; increases were registered also in exports to Latin American countries. Shipments to Canada and the United States were appreciably contracted.

Exports of dyes during the first four montha of 1932 and 1933 were as follows:

	First four months			
	1933		*1932*	
	Tons	*Value (Marks)*	*Tons*	*Value (Marks)*
Anilin	7,020	35,961,000	8,485	41,392,000
Alizarin	259	3,761,000	298	3,556,000
Alizarin, red	279	509,000	527	714,000
Indigo	1,582	3,978,000	1,368	4,254,000

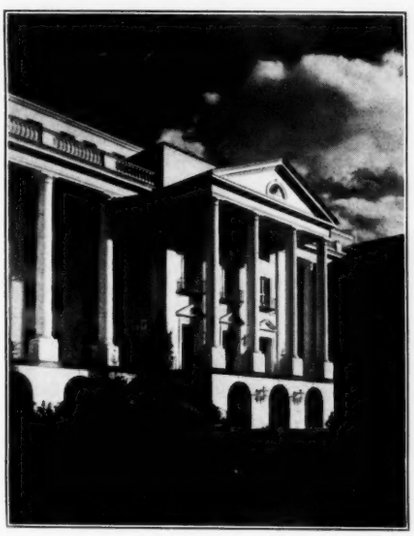
Glanstoff Dividend

American Glanstoff directors June 23 declared initial 75c dividend on prior pref., payable July 1 to holders of record June 24.

Fertilizers

Fertilizers & Recovery

It is extremely unlikely that the triumverate—White Sulphur Springs, June, and the N. F. A. Convention have ever met under the spell of a more optimistic feeling than that which pervaded the record-breaking assemblage gathered in West Virginia's noted resort, June 19, 20, and 21, for the ninth annual meeting.



White Sulphur Springs, noted southern resort, again welcomes Fertilizer Industry.

National Recovery Act, of course, was the magnet drawing members in such large numbers. The Fertilizer Recovery Committee (Horace Bowker chairman), which was organized tentatively May 16, and which later, by vote of the Board of Directors, was made a standing committee of the N.F.A., met at White Sulphur June 17 and arranged a tentative code to present to the convention. After devoting the major part of one day to discussing the Act it was decided to appoint a new and more comprehensive Committee to prepare a final draft of a code to present to General Johnson and his Commission in Washington. The new president, I.A.C.'s John J. Watson, is also chairman of this committee.

Principal speakers included Bayless Haynes, retiring president; Charles J. Brand; Horace Bowker; Dow's William J. Hale ("Realty in a Chemical Era"); and Simon H. Rifkind, who spoke on the Recovery Act.

In order to raise budget to required $160,370, dues have been increased to 5c per ton on bagged mixed goods and bagged material; 2½c per ton on bulk superphosphate and 1¼c per ton on phosphate rock, with a minimum active membership fee of $50 and associate fee of a like amount.

New officers in addition to Mr. Watson include C. T. Melvin, Gulf Fertilizer, as vice-president, and Charles J. Brand re-elected treasurer and secretary. New directors at large: George A. Holderness, V.-C.; H. B. Baylor, I.A.C.; Gustavus Ober, Jr., G. Ober & Sons; A. C. Read, Read Phosphate; L. W. Rowell, Swift.

Recovery Committee, with Mr. Watson presiding, met in N. Y. City, June 30, to frame final code for the industry.

Financial Viewpoint

Wall St. Journal's Broad Street gossip reports: "A little-noticed provision of the agricultural adjustment act, as applied to cotton, doubtless explains failure of fertilizer stocks to participate to a greater extent in stock market rise. As compared with stocks of agricultural implement companies, fertilizer issues have been slow to respond to 11c cotton and $1 wheat. Cotton farmers who contract with the government to take part of their acreage out of production are required to sign an agreement not to use more fertilizer on the remaining acreage than was used in 1932. On the other hand, farmer is given right to plant acreage taken out of cotton production, provided it is planted solely for production of soil improvement or errosion-preventing crops or food or feed crops for home use. Any possibility of cotton farmers intensifying yield of their remaining acreage by increased use of fertilizer appears to be disposed of by the provision quoted."

Nitrate Prices in Doubt

N. F. A. Meeting at White Sulphur, which called leading executives from their desks, and uncertainty surrounding foreign exchange as the London Economic Conference teetered from day to day on the brink of ignominious collapse over immediate currency stabilization plans, caused trading to be particularly quiet, particularly in the last half of the month.

Sodium nitrate schedule expired June 30. Last minute check on producers (July 7) resulted in report that orders were being taken for immediate shipment at June prices pending further announcement. It has been intimated, however, that no radical change is contemplated.* May imports of nitrate were the largest for any month so far this year (8,431 tons for May, 11,524 tons for first five months). Practically all of the May imports landed in Charleston.

Sulfate prices appeared stabilized at $21.50 a ton f.o.b. cars at ports for July-January delivery for domestic in bulk, and $22.50, c.i.f. ports, for July-December delivery for foreign. May imports were the lowest in several months (32,240 tons). New supply of sulfate, domestic plus imported, for first five months of 1933 is estimated at 348,933 tons. Generally speaking, domestic material was predominating inland, while some of the "port" business was shared with imported material.

Potash prices continued to remain unannounced with immediate business being taken at the provisional prices agreed upon two months ago. It is expected that this condition will speedily change, however with the definite pronouncement of President Roosevelt against any immediate return to a gold basis for the dollar. Schedule which was purposely withheld until the London Economic Conference treated with world currencies will in all probability be shortly released. Several factors in the market feel that the National Recovery Act will prevent any

*Reduced July 13, $1.00 a ton; sulfate raised to $24.00.

May Fertilizer Tag Sales

	Equivalent tons[1]							
	May				January-May			
	P. C. of 1932	1933	1932	1931	P. C. of 1932	1933	1932	1931
South—								
Virginia	110	28,308	25,782	26,931	109	218,952	201,621	299,311
North Carolina	96	47,591	49,805	48,030	131	819,248	625,648	942,672
South Carolina[2]	192	31,925	16,604	29,491	124	519,812	419,302	553,455
Georgia	[4]	[5]41,112	5,803	18,110	[4]	[5]462,968	354,601	681,681
Florida[2]	89	31,347	35,289	38,360	90	157,953	174,666	222,924
Alabama	825	26,400	3,200	8,800	132	266,700	201,300	413,950
Mississippi	233	8,377	3,600	9,600	99	81,771	83,000	193,495
Tennessee[2]	116	13,819	11,882	10,442	121	63,252	52,276	105,299
Arkansas[3]	111	2,500	2,248	2,525	122	20,935	17,198	60,846
Louisiana[2]	333	1,500	450	1,095	111	35,607	32,104	73,683
Texas	110	1,082	980	1,085	92	27,090	29,598	57,567
Oklahoma	...	....	....	....	67	1,925	2,875	6,724
Totals, South	150	233,961	155,643	194,469	122	2,676,213	2,194,189	3,611,607
Midwest—								
Indiana	174	17,906	10,281	10,375	90	40,228	44,699	111,805
Illinois	120	1,159	969	6,359	77	7,608	9,880	26,632
Kentucky	167	12,160	7,281	8,322	92	46,297	50,075	95,157
Missouri	1,500	1,155	77	133	52	7,243	13,972	25,698
Kansas	250	5	2	90	21	288	1,388	1,490
Total Midwest	174	32,385	18,610	25,279	85	101,664	120,014	260,782
Grand totals	153	266,346	174,253	219,748	120	2,777,877	2,314,203	3,872,389

[1]Monthly records of fertilizer tags are kept by State control officials and are slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various States.

[2]Cottonseed meal sold as fertilizer included.

[3]Excludes 26,570 tons of cottonseed meal for January-May combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

[4]and [5] April and May tag sales in Georgia were confused. The figures are subject to revision.

Important Price Changes		
Bone meal, raw, c. i. f....	$23.50	$23.00
Linseed meal.....	31.50	29.50
Nitrogenous material.....	2.40	2.25
	Declines	
Ammonium Sulfate.....	$21.50	$23.00
Fish scrap.....	2.60	2.70

serious price cutting in domestic material, and that, in all probability, foreign producers will string along, either at present or higher levels.

Other outstanding changes for the month was the advance from 97½c to $1.02½ per unit for cyanamid, and a much stronger position for bone raw and bone meal. As yet the domestic cyanamid producer has announced no price for the new granular top-dressing grade of cyanamid. Nitrogenous material after being in a strong position most of the month sagged slightly, as did dried blood and tankage. From Baltimore area comes reports that catch so far has been light.

German Nitrogen Exports

German exports of nitrogen carriers, including those for agricultural and industrial purposes, which had a momentary upward spurt in the last half of 1931 during the vigorous international nitrogen price war, has undergone further marked contraction this year of 25% in quantity and 32% in value, total exports dropping to 151,154 metric tons in first quarter from 202,748 metric tons in first quarter of last year. In first quarter of 1930 exports totaled 338,279 metric tons, so that in the space of four years German trade has recorded a loss of over 55% in volume.

Increase for ammonium chloride was striking, exports rising abruptly to 8,257 metric tons in first quarter of this year from 4,149 in same period of 1932. Combined group of calcium nitrate, urea and other nitrogenous fertilizers not specifically mentioned increased to 10,356 from 8,038 tons. Nitrites advanced to 902 from 557 tons, nitric acid to 2,815 from 2,416 tons, and ammonium carbonate to 476 from 407 tons.

All other products, including the leading ones—ammonium nitrate, sodium nitrate, potassium nitrate, sodium and potassium cyanide, nitrophoska, etc., ammonium sulfate—recorded trade shrinkage, in most cases appreciable. Most striking losses, however, occurred for sodium nitrate, to 20,574 from 59,490 tons; potassium nitrate, to 7,206 from 11,529; sodium and potassium cyanide, 521 from from 1,997 tons; nitrophoska and related fertilizers dropped to 3,968 from 4,889 tons, while the leading product—ammonium sulfate—fell to 95,750 from 108,700.

Traffic News

N. F. A. Secretary, Charles J. Brand and D. A. Dashiell, Association traffic committee head, will represent fertilizer industry in oral arguments before I.C.C. hearings when lower rates on basic commodities will be sought. Brief in case (I.C.C. 26,000) will be filed by Association.

Armour's L. A. Newell represented Association at I. C. C. hearings (16,295) when proposal to remove "bones" from list of fertilizer materials was opposed.

Miller Files Suit

C. Wilbur Miller, former Davison Chemical and Silica Gel president, has filed suit in Supreme Court, Baltimore, for $5,000,000 against group of financiers and corporations, alleging conspiracy ruined him financially. Defendants include Albert H. Wiggin, former Chase Bank head; Sir Auckland Geddes, former ambassador from Great Britain; Rio Tinto Co., Ltd.; Continental Illinois Bank & Trust Co., and Chase National Bank, John J. Watson, Henry E. Treide and others.

Mr. Miller alleged that because he had refused to enter into one-sided contracts to consolidate Davison Chemical with its chief competitor, Rio Tinto, a British concern, conspiracy had been undertaken and accomplished by defendants to wreck the Davison Co.

May Foreign Trade

Imports of fertilizer and fertilizer materials, during the month of May, according to N. F. A., totaled 101,085 long tons compared with 84,746 for last May and 72,974 for May, 1931.

Largest increases were shown in receipts of potash and "other fertilizers." In last classification 9,623 tons of fertilizer were received from Canada and 3,549 tons from the Netherlands. Ammonium sulfate imports totaled 32,240 tons against 46,321 for May of last year.

For first time in many months sodium nitrate imports were substantial. During May, 8,431 tons were received, compared with 37 for May, 1932, and about 35,000 tons for May, 1931. Five months' total for sodium nitrate imports is 11,524 tons compared with 44,307 tons last year, and 336,254 tons for the first five months of 1931.

Exports of fertilizer and fertilizer materials during May totaled 60,349 long tons against 81,697 tons for May, 1932 and 107,918 for May, 1931. Exports of "nitrogenous chemicals," chiefly domestic synthetic sodium nitrate, potash fertilizers, and concentrated chemical fertilizers were larger than those recorded during May, 1932. Exports of phosphate rock totaled 51,739 tons against 75,566 tons for May, 1932. Superphosphate shipments were slightly over 50% of the shipments for May, 1932.

June phosphate shipments from the port of Tampa, Fla., totaled 45,806 tons, according to preliminary custom house figures, which indicate a final total of close to 50,000 tons for the month. The average 1932 monthly shipments was 31,500 tons.

Del-Mar-Va Meets

Del-Mar-Va Peninsula Fertilizer Association's 13th annual convention was held at Ocean City, Md., June 24. Interesting program included John W. Trought, "Statistics;" H. R. Smalley, N. F. A., "Experimental Work on Fertilizer Application;" Charles J. Brand, "The Present State of Agriculture;" L. E. Bobst, associate state chemist, Maryland, "The Benefits of Co-operation;" A. E. Mercker, U. S. Dept. of Agriculture, "The Work of the Early Potato Committee."

April Superphosphate

Superphosphate production for April was 19% larger than April, 1932, while production for first four months was about 2% larger than the same time in 1932. April superphosphate production was 126, 550 tons, compared with 106,288 tons in April, 1932; four months, 612,881 tons, against 599,724 in the four months of 1932. April shipments were 678,893 tons, against 575,930 tons during same month last year. Total for January-April, 1,274,418 tons, against, 1,111,742 tons for the same time in 1932. Stocks on hand on April 30 were 610,502 tons, against 1,085,385 tons on same date last year.

Important New Booklets

"The New Deal," "The Inquiring Mind and The Seeing Eye," and "A Practical System of Soil Diagnosis" are among items appearing in June-July number of "Better Crops With Plant Food," published by N. V. Potash Export, My., N. Y. City.

Du Pont is mailing booklet describing urea-ammonia liquor in fertilizer manufacture; address ammonia Dept., Wilmington, Del.

Dr. U. M. McCool's, (Boyce Thompson Institute) paper "Properties and Uses of Calcium Cyanamid" points out that cyanamid shows up best where soil needs lime as well as nitrogen. Other advantages are detailed. Consumption has increased from 29,000 tons in 1911 to more than 1,000,000 tons annually.

Deaths

James T. Washburn, I. A. C. Cincinnati sales manager, died recently at his home in that city. He had been connected with International since its formation and was made sales manager for the Mid-west division in 1918.

Josef Hercz, general director, Klotildeung Chem. Industrie A. G., and vice-president, Hungarian Chemical Association, outstanding leader in sulfuric and superphosphate technology, died recently.

D. Frank Fooks, treasurer of Worcester Fertilizer, and secretary, Del-Mar-Va Fertilizer Association, died suddenly June 4 at his home at Snow Hill, Md.

George M. Sherman, 55, member of Edward J. Walter & Co., fertilizer and chemical brokers, was found shot to death in his offices in Baltimore, June 5.

Phosphate "Dumping"

U. S. Supreme Court has refused to review recent decision of Court of Customs and Court of Patent Appeals whereby dumping duties were imposed upon a shipment of phosphate rock imported from Morocco. Appellant, J. H. Cottman & Co., Baltimore, claimed that the question of dumping was not involved, as sales of phosphate rock in Morocco had been made at a price lower than that at which the rock had been valued for entry into this country.

German Superphosphate

Germany's consumption of superphosphate in fertilizer year ended March 31 recorded a heavy increase. Informed circles estimate that total consumption will exceed by around 40% the 640,000 metric tons consumed in 1931-1932.

Greatly increased demand had a gratifying effect upon German superphosphate industry which previously had been languishing, operating at around 1/3 capacity, dut not only to contracted demand, but also formidable competition from foreign superphosphate and basic slag.

German imports of phosphate materials follow:

	First four months		
	1931	*1932*	*1933*
Phosphate rock and related materials.....	228,030	90,245	220,866
Superphosphate.....	95,650	94,080	25,167
Basic slag.....	573,956	284,115	271,510

Tennessee Rock

Fifteen of the phosphate counties of Tennessee are on the Tennessee or its tributaries and eight of these are along Duck River, thus making it highly probable that development of navigation and at least part of the large power possibilities of that stream will be put forward for early action under the Roosevelt plan for the Tennessee River Valley.

Potash News

Closer government control of German potash industry is indicated by appointment of a larger number of farm representatives on the Potash Council. Outlook is for lower prices to German farmers, it is reported.

Deutsche Bergwerks-Zeitung reports German potash syndicate sales in first quarter reached 422,500 metric tons (K_2O), or 45,000 tons more than in corresponding period of 1932. March, 1933, sales are reported at 200,000 tons K_2O, as compared with 150,000 tons in March, 1932.

Carlsbad Potash has started core drilling on Grimes permit located two or three miles south of the holdings of U. S. Potash, Carlsbad, N. M. Hole will be drilled to a depth of 1,000 feet. Officers of the company: H. A. Nobles, Amarillo, and F. C. Fritchie.

American Cyanamid is considering production of granular Ammo-Phos 11-48-0 for direction application.

Foreign Nitrogen

Chilean administration shortly will propose to Congress new sales organization to replace now defunct Cosach; new company will be known as Nitrate & Iodine Sales Corp. and will have complete control of sales of these products.

Norsk Hydro Elektrisk, largest Norwegian industrial plant, will close for eight or ten weeks July 1. This announcement came as a surprise in Norway, as exports of calcium nitrate and sodium nitrate, the company's principal products, have been quite heavy in recent months.

French Government's Toulouse nitrate plant reported to have a 1933-34 capacity of 50,000 tons (nitrate). Last year production reported between 15,000 and 20,000 tons.

An inter-ministerial commission has been created in France for studying problems relating to production, distribution and consumption of nitrogenous materials.

After five years' experiments in various districts in France new fertilizer has been placed on the market composed of double magnesium and calcium nitrate with a nitrogenous content of 15.5 per cent., of which 14.75 per cent. is nitrate nitrogen and .75 per cent. ammonium nitrate, 7 per cent. water soluble magnesium and 16 per cent. water soluble calcium.

Mitsui interests and others have formed new ammonium sulfate producer—Toyo Koatsu Kogyo Co. Estimated capacity, 120,000 tons a year. Another plant (50,000 tons capacity) is contemplated by newly formed Ube Chisso Kogyo Kaisha, Ltd.,—Y. Watanabe, Ube, Oita-Ken, organizer. Latter plant will use Haber process.

South Carolina Railroad Commission has ordered all common carriers in State to show cause before July 25 why rates on fertilizer in car-load lots or less should not be substantially reduced.

Amsterdam plants of Amsterdamsche Superfosfatfabriek and Vereenigde Chemische Fabrieken, a subsidiary making sulfuric, have been closed down owing to decreased home and export demand.

Customs' Ruling

Mixture of 95% soybean oilcake meal and 5% corn meal is not a mixed feed, U. S. Court of Customs and Patent Appeals has decided.

J. Russell Porter, prominent in fertilizer trade, is associated with American Potash and Chemical, N. Y. City, as potash sales manager. Mr. Porter has been president of Porter Fertilizer, Atlanta. He was a president of former Southern Fertilizer Association.

Enterprize Mfg. Co's, Pittsburgh, N. C., cotton seed oil mill and fertilizer manufacturing plant destroyed by fire. Loss estimated at $50,000.

Brunswick Navigation, Southport, N. C., incorporated to manufacture fertilizer, fish, oil and scrap. Incorporators: John L. Morehead, U. H. Cozart and W. P. Anderson, Jr.

According to Prof. C. B. Williams, North Carolina State College, sales of 3-8-3 amounted to 56% of the N. C. 1931 sales total and 57% of the 1932 total. New law effective Jan. 1, 1934, prohibits sale of 2-8-2, or any other analyses containing less than 14% total plant food.

N. Y. Journal of Commerce commenting editorially on "Sulfur and Potash Taxes" said recently: "Not content with cutting down the production of sulfur with a tax of 75c per ton, legislators in Texas are now considering measures which will boost the rate to either $1 or $1.50 per ton.

"Sulfur extraction industry met 75c levy last year by curtailing production 58 per cent. to 889,695 long tons. Foreseeing such taxation, producers had accumulated a good store above ground and sales to domestic and foreign buyers last year resulted in a reduction of 219,000 tons. But there was still on hand at the end of 1932 a large reserve of 3,031,000 tons. It is reasonable to assume, in the event that a $1 or a $1.50 sulfur tax is adopted by Texas, that production will be further reduced.

"But the most unpardonable attempt to penalize a basic chemical industry was witnessed a few weeks ago in New Mexico, where a measure was introduced to place a tax of 20c per ton on potash, country's newest chemical industry, where to date only one company is successfully bringing crude potash above ground and refining it. We are still dependent upon foreign sources for potash to extent that no one would propose a tariff upon it.

"It should be of some interest to the Texas legislators to know that while sulfur producers here were forced to curtail last year, the Sicilian and Japanese sulfur industries were able to expand their outputs. Enviable position of American sulfur in foreign markets has been due to its low cost. In 1914 world used 2.6 per cent. sulfur and 73.7 per cent. pyrites ore in the manufacture of sulfuric. By 1930, 67 per cent. sulfur was used for this purpose and only 22 per cent. pyrites.

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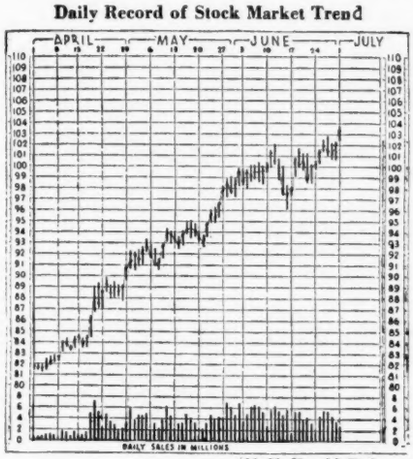
The Financial Markets

Back to 1926 Prices

Stocks again advanced in June, the fourth successive month of appreciation of values. "Bears" are once more "Bulls" and "John Public" is again back in the market "with both feet." While the market experienced set-backs in the second and third weeks, due largely to the wide-

Daily Record of Stock Market Trend



N. Y. Herald-Tribune

spread belief that the dollar would be immediately stabilized at the London Economic Conference, bullish sentiment about business was sufficient to hold prices without serious losses. Announced opposition of the President to a course of immediate stabilization, contained in his now famous message to the London Conference, resulted in a fresh wave of buying in the last few days of the month and drove price levels into new high ground.

Shares listed on the N. Y. Stock Exchange showed a theoretical increase in market value of approximately $3,000,000,000 in June.* The rise in the computed value of listed stocks is approximately $15,700,000,000 since March 1.

June Gain Below May

Last month's rise carried stocks to the highest levels since November, 1931. Volume of trading was larger than in any month in Exchange history except October, 1929. Gain compared with an increase of $5,658,000,000 in May, $6,900,000,000 in April and of $215,000,000 in March. Market value of listed stocks is now approximately $35,500,000,000, compared with $19,700,000,000 on March 1.

Enhancement in value of 240 representative issues (*N. Y. Times index*) listed on the Exchange was $2,418,817,267, or 13%, compared with a gain of $3,065,367,525, or 20%, in May. In June, 1932, there was a decline of $209,693,962.

Average rise in points of the 240 stocks was 3.108, compared with 4.666 in May. Largest gain was in the railroad equipment group, 8.797 points, while the smallest was .392 points in the fifteen copper stocks. Since the end of February the rise in the group has amounted to $9,905,619,090, of 92%. The chemical group had an average appreciation of 5.930 points which was only exceeded by the upturn in the railroad equipment group.

Despite upturn of the last three months, market price of the 240 issues is still 59% lower than peak levels of 1929. Recovery since the end of June, 1932, has amounted to 150%.

Most stocks, with the exception of those of the railroads, have already moved back to the range of 1926. Since the administration is said to be committed to a program of raising general price levels to the 1926 level, stock prices of that year are regarded by some brokers as a useful yardstick.

The following table shows the changes in the 20 groups of the *N. Y. Times* compilation:

Group and Number of Issues	*June, 1933* — *Avr. Net Ch'ge in Points*	*Change in Values*
Amusements (5)	+ 1.200	+ $12,192,080
Building equip. (9)	+ 5.111	+ 71,853,251
Business equip. (4)	+ 4.187	+ 29,285,653
Chain stores (14)	+ 2.375	+ 107,317,929
Chemicals (9)	**+ 5.930**	**+ 139,232,100**
Coppers (15)	+ .392	+ 4,344,232
Dept. stores (10)	+ 1.250	+ 11,443,973
Foods (19)	+ 3.349	+ 200,393,395
Leathers (4)	+ .625	+ 1,235,658
Mail order (3)	+ 4.542	+ 58,048,816
Motors (15)	+ 2.742	+ 298,604,762
Motor equip. (7)	+ .982	+ 2,412,582
Oils (22)	+ 1.494	+ 327,443,980
Public utilities (29)	+ 5.077	+ 576,018,203
Railroads (25)	+ 3.930	+ 322,341,416
Railroad equip. (8)	+ 8.797	+ 77,896,358
Rubber (6)	+ .583	+ 7,277,753
Steels (13)	+ 3.942	+ 122,106,691
Sugars (9)	+ .597	+ 4,694,327
Tobaccos (14)	+ 2.536	+ 44,674,108
Average and total 240 issues	+ 3.108	+$2,418,817,267

Prominent part played by the chemical group in the recovery of the past months continued to feature the market. Outstanding was the rise in the alcohol shares. Every state referendum appeared good for a five point rise, with doubtful ones, such as Iowa and West Virginia showing even greater appreciation. Commercial Solvents was a strong favorite during the month and particularly in the last few days of June. Sentiment was very bullish after the announcement of the purchase of Rossville and Solvents practically doubled in price in the 30 day period. Movement in Allied was erratic and reflected the uncertainty surrounding the possibility of a pitched battle of proxies between the management and the stockholders' group headed by C. W. Nichols. With publication of the news that Messrs. Weber and Atherton had effected a satisfactory agreement with the Exchange heads stock again turned upward with a sudden rush, carrying it to a new high for the year on the last day of June.

Chemical Appreciation

Appreciation in the chemical group (nine leading stocks) amounted to $139,232,100 compared with $385,593,291 in May and $403,188,208. Changes in value were as follows in June:

Company	*Advances*
Allied Chemical & Dye	$31,817,066
Commercial Solvents	27,517,687
Du Pont de Nemours	35,963,476
Mathieson Alkali Works	2,926,962
Texas Gulf Sulphur	7,620,000
Union Carbide & Carbon	27,680,811
U. S. Industrial Alcohol	5,514,228
Virginia Carolina Chem.	60,138
Westvaco Chlorine Prod.	131,732
Total	139,232,100

The net changes from January through June have been as follows:

	Increases	*Declines*
January	$39,652,757	.....
February	.....	$168,411,582
March	24,037,138	.....
April	403,188,208	.....
May	385,593,391	.....
June	139,232,100	.....
Total appreciation	$822,292,012	$168,411,582

Recouping the Losses

The entire decline for 1932 in the chemical group amounted to only $368,177,263, so that the enhancement of values since Jan. 1 has more than restored 1932 levels and has gone a long ways to cutting into the losses sustained in 1931. Generally speaking, chemical stocks have shown in the past three or four years remarkable stability and earning power compared with many of the other industries.

*Market value of all chemical stocks on Exchange June 30, $3,396,080,507, compares with $3,052,434,289 May 31 and $2,444,271,453 on April 30. Average price is now at $48.37 against $43.93 on May 31.

Price Trend of Chemical Company Stocks

	May 27	*June 3*	*June 10*	*June 17*	*June 24*	*July 1*	*Net Change*
Allied	104¼	112⅞	119⅞	112¾	115¾	115¼	+11
Air Reduction	77½	80¾	78½	77¼	82	87¾*	+ 9⅞
Anaconda	13⅜	18	17¼	14⅝	16⅛	16⅞	+ 3½
Columbian Carbon	52	59	60½	56½	58¾	62	+10
Commercial Solvents	18¾	19⅜	19¼	17¾	22½	29¼	+10½
DuPont	71⅜	83¼	79⅝	72⅝	76¾	78¾	+ 7⅜
Mathieson	26⅞	29¼	29	26	29	31	+ 4⅛
Monsanto	47½	47	47⅝*	47½	49	55½	+ 8
Std. N. J.	34⅜	37⅛	37⅛	35⅛	38	37½	+ 3⅛
Texas Gulf	27½	29⅞	28⅜	26¾	30	31½	+ 4
U. S. I.	47¼	47⅞	47⅝	45¾	51½	60¼	+13

*ex rights.

"Battle of the Century" Ends

Perfect melodrama—a deep laid plot, the villian, the hero, the saving of the old homestead in the nick of time, reconciliation and a happy ending—were enacted in the past month by the principals in the three-cornered dispute over Allied attitude toward releasing facts in the company's annual financial reports.

With a "dead-line" set at Aug. 23 for trading in Allied common and preferred by the N. Y. Stock Exchange Governing Committee and with an opposition stockholders' Committee, headed by C. W. Nichols, actively soliciting proxies for a demand call for a special meeting set tentatively for Aug. 10, President Weber assumed a more active role, in the controversy and in a long letter sent to stockholders on June 14 charged that behind the screen of the controversy foreign chemical interests subsidized by governments abroad were driving to obtain control of the corporation.

"The move of the new stockholders' committee," Mr. Weber stated, "is far more than a threat to the management. It is a threat to the entire country both in a time of war and of peace." He recalled that only since the World War had this country made itself independent of the rest of the world for its nitrogen, dyestuffs and other necessary chemicals.

Mr. Weber charged in his letter that Gordon Auchincloss, one of the Stockholders' Committee members, has for many years been the principal representative in this country of Solvay & Cie, "one of the most powerful chemical companies in the world." Mr. Auchincloss is a director of the Solvay American Investment Corp., a subsidiary of Solvay & Cie., which owns nearly 20% of the capital stock of Allied. The remaining 80%, according to Mr. Weber, is American owned.

Missing Foreign Representation

Explaining for the first time reason for the dropping of the representatives of foreign interests in Allied from the board of directors, Mr. Weber's letter in part states:

"There has now been eliminated all representation of foreign interests on your board of directors. The management of your company has not favored and does not now favor the presence on the company's directorate of any representative of Solvay American Investment or any other subsidiary of Solvay & Cie. The management believes that it might now be disastrous to your company to have representation of the company's principal world competitors participate in the company's directing management." Allied's president, famous for his reticence, further recalls for the stockholders that the committee represents principally Solvay American Investment stock and that this stock was used as collateral to obtain $40,000,000 from American investors "largely for the purpose of building European chemical plants which compete with your company in the markets of the world."

Mr. Weber's letter immediately brought forth a "hot" reply from the Stockholders' Committee. Said Roger S. Lamont, secretary:

"Mr. Weber undertakes to draw a red herring across the real trail. The Stockholders' Committee is not attempting to obtain control of the Allied Chemical and Dye Corp., for any interest. The Committee believes three or four new and representative directors will be able to force a change in management towards the stockholders." He reiterated that the sole desire of the Committee was to appease the N. Y. Stock Exchange so as to prevent the stock from being removed.

Solvay & Cie also replied directly to Mr. Weber's charges, denying that any of the companies in which substantial stock is held are in competition with Allied, except in the alkali group.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs	.50	June 15	July 1
Air Reduction	.75	June 30	July 15
Allied Chem., pf	$1.75	June 12	July 1
Amer. Maize Prod.	.25	June 15	June 30
Amer. Maize Prod. pf	$1.75	June 15	June 30
Canadian Ind. Ltd., 7% pf.	$1.75	June 30	July 15
Celanese 7% 1 pt. pf. Acc.	$5.00	June 17	June 30
Celanese 7% cum. pr pf.	$1.75	June 17	July 1
Checkasha Cotton Oil Spec.	.25	June 15	July 1
Clorax Chemical	.50	June 20	July 1
Clorax Chemical	.50	Sept. 20	Oct. 1
Clorax Chemical	.50	Sept. 20	Oct. 1
Colgate Palm-Peet pf.	$1.50	June 10	July 1
Com'l Solvents com.	.30	June 2	June 30
Consol Chemical Indus pf A	.37½	July 15	Aug. 1
Corn Products, Ref.	.75	July 3	July 20
Corn Products, pf.	$1.75	July 3	July 15
Devoe & Raynolds, 1st pf.	$1.75	June 20	July 1
Devoe & Raynolds, 2nd pf.	$1.75	June 20	July 1
DuPont deb.	$1.50	July 10	July 25
Eastman Kodak	.75	June 5	July 1
Eastman Kodak, pf.	$1.50	June 5	July 1
Freeport Texas, pf.	$1.50	July 14	Aug. 1
Gen'l Printing Ink pf.	$1.50	June 17	July 1
Glidden pr pf.	$1.75	June 16	July 1
Hazel Atlas Glass	.75	June 17	July 1
Hazel Atlas Glass ext.	.25	June 17	July 1
Hercules Powder	.37½	June 13	June 24
Heyden Chemical, pf	$1.75	June 20	July 1
Industrial Rayon	.75	June 19	July 1
Int'l Nickel, pf.	$1.75	July 3	Aug. 1
Int'l Salt	.37½	June 15	July 1
Koppers Gas & Coke pf.	$1.50	June 12	July 1
Lambert Co.	$1.00	June 17	July 1
MacAndrews & Forbes	.40	June 30	July 15
MacAndrews & Forbes pf.	$1.50	June 30	July 15
Mathieson Alkali	.37½	June 12	July 1
Math. Alkali, pf.	$1.75	June 12	July 1
Merck Corp., pf.	$2.00	June 17	July 1
Metal & Thermit	$1.00	July 20	Aug. 1
Monroe Chem. pf.	.87½	June 15	July 1
Monsanto Chemical Works	.31¼	June 10	July 1
Nat'l Carbon, pf.	$2.00	July 20	Aug. 1
Nat'l Distillers Prod. pf.	.62½	June 10	July 1
Nat'l Lead	$1.25	June 16	June 30
Nat'l Lead B pf.	$1.50	July 21	Aug. 1
Ohio Leather	.25	June 20	July 1
Ohio Leather, 1st pf.	$2.00	June 20	July 1
Ohio Leather, 2nd pf.	$1.75	June 20	July 1
Ownes-Illinois Glass pf.	$1.50	June 15	July 1
Parke-Davis	.25	June 19	June 30
Penn. Salt Mfg.	.75	June 30	July 15
Pittsburg Plate Glass	.15	June 10	July 1
Pratt & Lambert	.12½	June 16	July 1
P & G	.37½	July 25	Aug. 15
P & G 8% pf.	$2.00	June 23	July 15
Southern Acid-Sulfur	.50	Sept. 10	Sept. 15
Spencer Kellogg & Sons	.15	June 15	June 30
Union Carbide	.25	June 2	July 1
United Carbon	.25	June 16	July 3
United Dyewood, pf.	$1.75	June 19	July 1
United Pure Dye Wks, pf.	$1.62½	June 20	July 1
U. S. Gypsum	.25	June 15	July 1
U. S. Gypsum, pf.	$1.75	June 15	July 1
U. S. Smelt & Rfg.	.25	July 3	July 15
U. S. Smelt & Pfg. pf.	.87½	July 3	July 15
Vulcan Detinning, pf	$1.75	July 7	July 20
Westvaco Chlorine pf.	$1.75	June 15	July 1
Will & Baumer, pf.	$2.00	June 15	July 1
Young, J. S. Co.	$1.50	June 23	July 1
Young, J. S. Co., pf.	$1.75	June 23	July 1

Gerard's Position

James W. Gerard, former U. S. Ambassador to Germany, and the one first voicing opposition to the management's annual reports, unexpectedly came out in support of Mr. Weber, indorsing his statements about Solvay American Investment and Solvay & Cie. Mr. Gerard urged Solvay & Cie to take Belgian bonds in exchange for its Allied stock, the Belgian Government in turn offering these securities to the U. S. Government in part payment of the former's war debts. Other supporters of Mr. Weber's statement on Solvay & Cie included Rowland Hazard, a director in Allied and representative of the large Hazard family holdings, Francis P. Gravan, president of the Chemical Foundation and 20 other leading business executives.

Sudden Ending

On June 30 the N. Y. Stock Exchange suddenly announced that a basis for settlement had been reached with the Allied management. Announcement by the Exchange read in part:

"As a result of further negotiations, the president of the Allied Chemical & Dye Corp. and the committee on stock list have agreed upon a basis of settlement of the matters in controversy between the company and the Exchange. A joint statement in regard to the agreement of settlement will be published as soon as it can be submitted to and approved by the board of directors of the company and the governing committee of the Exchange."

Spokesmen for the Stockholders' Committee refused to comment on the sudden turn of affairs until after the issuance of the full text of the settlement. It is thought unlikely in chemical and financial circles, however, that the promised "Business Battle of the Century" will now take place, unless either Mr. Gerard or the Stockholders' Committee resort to the courts in an attempt to inspect the books of the Corporation.

Details Disclosed

On July 6th the Exchange and Allied divulged the details of the agreement. According to its terms Allied will meet the Exchange's demands for more details in its income account and balance sheet, including number of its own shares it has acquired, value at which they are carried on the books; amount of interest and dividends received, and other non-operating income; market value of investments

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More Detailed Reports

Corporation agrees that no material items of income or profit shall be credited to any reserve account without being first credited to the income account or the surplus account, as the case may be, and then shown as a deduction from such income or surplus account when appropriated to a reserve account.

That in the president's letter accompanying future annual reports there shall be a statement of the gross amount in dollars of all retirements from plant account and if any material part of such retirements shall have been occasioned by the actual sale of property the amount of such retirements shall be separately stated.

Corporation will not change its policy in regard to depreciation or obsolescence without notice to the Exchange and stockholders.

Dow Annual Meeting

Dow almost exactly earned dividend of $2 a share on common during past year and at the same time increased ratio of assets to liabilities from 3.19 to 1 a year ago to 4.59 to 1 this year, it was revealed at the annual meeting June 29 by Williard H. Dow, president at the plant. Earnings a year ago were $2.95.

Stockholders seemed favorably impressed with report which showed net earnings of $1,470,187; total assets of $22,131,398 and a surplus of $6,610,566. A total of 498,000 shares were represented at session according to a preliminary check as compared with 575,111 a year ago.

Meeting was opened by A. E. Convers, chairman of the board of directors and he commented on the successful operation of the plant in the face of economic chaos, which has curtailed the activities of so many industrial concerns the country over. James T. Pardee, secretary, then presented annual financial report from the official audit.

All directors were unanimously chosen without change and following the meeting officers were elected the same as a year ago: A. E. Convers, chairman of the board; Willard H. Dow, president and general manager; James T. Pardee, vice-president, and secretary; J. S. Crider, treasurer; E. W. Bennett, vice-president and assistant treasurer; W. R. Veazey, E. O. Barstow and C. J. Strosacker and G. E. Collings.

A high spot in the firm's report appeared to be the statement that bank indebtedness had been eliminated and a cash reserve of $561,390 built up. In addition to paying $700,000 in notes an investment of $603,916 was made principally in their own gold notes. A total of 125 new share holders were added to the books during the year, making a total of 1703. Patents have jumped to 480, a sharp increase for 1932-33.

An increase in the number on the payroll by 10%, making total 2012, was another point of interest. Larger production of ethylene compounds; a 30% jump in dowmetal sales; establishment of a dye agency in China and rapid growth of subsidiaries were other high spots in the report.

Outstanding production jump reported was that of the iodine business of Jones Chemical which increased its output five times during year.

American Solvents Bonds

Committee of which Joseph P. Ripley is chairman and under whose direction American Solvents & Chemical Corp., now Rossville Alcohol & Chemical Corp., was reorganized, is notifying holders of various securities involved in that reorganization that it has decided to terminate as of the close of business July 14 the time for depositing debentures under plan. Because of this, holders of American Solvents & Chemical Corp. (Md.) 6½% 10-year sinking fund gold debentures; General Industrial Alcohol Corp. convertible 6½% sinking fund debentures and Rossville Commercial Alcohol Corp. (Md.) 20-year sinking fund 6% convertible debentures, who have not yet deposited their debentures are advised to lodge them before that date with City Bank Farmers Trust, 22 William st., N. Y. City depositary.

Holders of debentures so depositing will receive, directly against deposit of their debentures, 7% convertible preferred stock and common stock certificates of Rossville Alcohol & Chemical Corp. and cash to which such debentures are respectively entitled under terms of reorganization plan.

A special meeting of stockholders of new Rossville company will be held July 18 to approve agreement whereby Commerical Solvents will purchase industrial alcohol business of Rossville.

General Refractory Plan

With approximately 95% of outstanding notes deposited, committee for General Refractories 2-year 5% notes, due March 1, 1933, and company have declared operative plan providing for refunding of notes. Company has amount required to pay interest due March 1, 1933, on the notes. Permanent bonds of company's new issue of $6,000,000 5-year 6% first cumulative income bonds will be ready for delivery July 1. Additional deposits of notes will be received up to July 1.

United Carbon Resumes

United Carbon has resumed dividend payments on both preferred and common. A semi-annual payment of $3.50 a share on 7% non-cumulative preferred stock and a quarterly of 25c on common were approved June 6. Both are payable July 1 to stock of record June 16. Last previous payment on common was in January, 1931, while no payment had been made on preferred since May of that year.

Oscar Nelson, president, reports company had paid off $250,000 of bank loans and had cash deposits exceeding $700,000. Sales of black in May were largest in company's history.

N. Y. Stock Exchange has admitted to trading on notice of issuance 51,293 additional shares of American Commercial Alcohol common—$20 par. This includes 10,000 shares to be given in exchange for common of Maister Laboratories, Ltd., owner of vitamin yeast patents. Balance is for additional working capital.

Standard Chemical Co., directors recently decided to omit annual dividend ordinarily payable about June 27 on the capital stock, no par value. On June 27 a year ago, an annual distribution of 50c per share was made, compared with $1 per share on June 26, 1931.

Grand Rapids Varnish renewed dividends when 5c a share was voted payable June 12 to holders of record June 5. Last dividend of 7½c paid Dec. 31.

National Oil Products declared extra dividend of $1 on common in addition to regular semi-annual dividend of $1, both payable July 1 to holders of record June 20.

Curb has removed from trading A. E. Staley Mfg. Co.'s 7% pfd., par $100; Rio Tinto, Guaranty Trust American depositary receipts for ordinary bearer shares, par £5.

Foreign Markets

London	May 27	June 30
British Celanese	13s 3d	17s 6d
Celanese	£7¾	£13
Courtaulds	£1¾	£1⅞
Distillers	58s 3d	68s 3d
Imperial Chemical	26s 7½d	26s 10½d
Un. Molasses	8s 3d	8s 9d
Paris		
Kuhlmann	1020*	640
L'Air Liquide	610*	840
Berlin		
I. G. Farben	129	129
Milan		
Italgas	113¾	
Montecatini	108¼	112¾
Snia Viscosa	177	179

*May 26

Over the Counter Prices

	May 27		June 30	
J. T. Baker	..	..	..	..
Dixon	30	37½	35	42
Merck, pfd	90	95	97	100
Worcester Salt	..	..	44½	48½
Young, J. S., pfd	80	..	81	..
Young, J. S., com	48	..	54	..

COLUMBIA BRAND

99% - 100%
SODA ASH
58% Na_2O
Light – Dense
Dustless or Granular
Especially for Glass Makers

98% - 100%
CAUSTIC SODA
76% Na_2O
All Tests
Solid – Ground – Flake
and Liquid

MODIFIED SODAS

CALCIUM CHLORIDE
Flake – Solid – Liquid

WHITING

THE COLUMBIA ALKALI CORPORATION

Executive Sales Offices
EMPIRE STATE BUILDING, NEW YORK

Branch Sales Offices
Barberton, Ohio
431-451 St. Clair St., Chicago — Carew Tower, Cincinnati — Santa Fe Terminal Bldg., Dallas

Plant at BARBERTON, OHIO

OTHER
Barrett *Standard*
CHEMICALS

PHENOL (Natural)
U.S.P. 39.5°-40° M. Pt.
Technical 39° M. Pt.
Crude 82-84% and 90-92%
CRESOL
U.S.P., Meta Para, Ortho, Special Fractions
CRUDE CRESYLIC ACID
99% Straw Color and 95% Dark
XYLENOLS
TAR ACID OILS
NAPHTHALENE
Crude, Refined Chipped, Flake and Ball
RUBBER SOFTENERS
CUMAR*
Para Coumarone-indene Resin
BARRETAN*
PICKLING INHIBITORS
PYRIDINE
Refined Denaturing and Commercial
PICOLINES
QUINOLINES
FLOTATION OILS and REAGENTS
HYDROCARBON OIL
SHINGLE STAIN OIL
SPECIAL HEAVY OIL
HI-FLASH NAPHTHA
*Reg. U. S. Pat. Off.

EXPRESS TANK-BUS DELIVERIES

The scientific control exercised in the manufacture of Barrett Standard Benzols results in a degree of uniformity and dependability which is keenly appreciated in all industries where coal-tar solvents are used.

If your plant is located within fifty or sixty miles of a city listed in this advertisement, take advantage of Barrett express tank-bus deliveries of Benzol solvents. 'Phone your order.

THE BARRETT COMPANY
40 Rector St. New York, N. Y.

*Boston	Everett 4660
Buffalo	Delaware 3600
*Chicago	Lawndale 1500
Cincinnati	West 4114
*Cleveland	Cherry 5943
*Detroit	Vinewood 2-2500
Indianapolis	Lincoln 8223
Los Angeles	Tucker 9903
*Newark	Mitchell 2-0970
New York	Whitehall 4-0800
*Philadelphia	Jefferson 3000
St. Louis	Riverside 6510
San Francisco	Kearny 1505

*Hi-flash Naphtha available at these stations.

Barrett *Standard*

BENZOL TOLUOL XYLOL SOLVENT NAPHTHA

COAST TO COAST DISTRIBUTING POINTS

The Industry's Securities

1933 June Last	1933 High	1933 Low	1932 High	1932 Low	Sales In June	Sales During 1933	Stocks	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1931	Earnings $-per share-$ 1930
NEW YORK STOCK EXCHANGE												
89½	92⅞	78	92⅞†	47½	94,300	438,300	Air Reduction	No	841,288	$3.00	4.54	6.32
115½	122⅜	101½	122⅜†	70¾	359,800	1,845,500	Allied Chem. & Dye	No	2,401,000	6.00	6.74	9.77
199⅞	120	115	121⅞	115	5,600	19,600	7% cum. pfd	100	393,000	7.00		
22½	23½	17⅛	23½†	7¼	38,200	121,600	Amer. Agric. Chem	100	333,000		Yr. Je. '30	Nil
40	42¼	30⅛	42¼†	13	27	11	419,000	797,900	Amer. Com. Alc. (new)	20	375,000			d1.27
28⅜	29	21½	29†	9¾	15½	7	34,300	62,100	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30	1.68
37¼	37½	21	37½†	9	25½	7*	47,600	95,000	Atlas Powder Co	No	261,438		.59	2.67
78½	78½	69	78½†	60	79½	45½	1,930	3,814	6% cum. pfd	100	96,000	6.00		
62½	65½	53⅝	65½†	23⅛	41¼	13½	184,800	681,900	Columbian Carbon	No	538,420	2.00	3.02	5.04
29½	30⅝	17⅛	30⅝†	9	13¾	3½	1,366,000	2,830,800	Comm. Solvents	No	2,530,000	.60	.83	1.07
79½	81½	69⅜	81½†	45⅝	55⅜	24½	186,000	1,148,200	Corn Products	25	2,530,000	3.00	3.54	4.82
136	136	133	145½	117½	140	99½	1,970	5,960	7% cum. pfd	100	250,000	7.00		
79¼	83½	71⅛	83½†	32½	59½	22	1,391,800	3,782,500	DuPont de Nemours	20	11,008,512	2.00	4.29	4.67
112	113½	105½	113½†	97½	105½	80¾	6,000	31,500	6% cum. deb	100	1,098,831	6.00		
83⅞	85	77¼	85†	46	87¼	35¼	80,200	405,018	Eastman Kodak	No	2,261,000	3.00	5.78	8.84
121	121	119	130	110	125	99	350	1,290	6% cum. pfd	100	62,000	6.00		
36½	40½	32	40½†	16⅛	28⅝	10	126,400	439,400	Freeport Texas Co	No	730,000	2.00	3.26	w4.77
61½	61½	33	61½†	15	29½	13¼	101,100	192,300	Hercules Powder Co	No	606,234	1.50	1.04	2.61
104½	106	96½	106†	85	95	70½	570	2,690	7% cum. pfd	100	114,241	7.00		
3¼	3⅞	2⅜	3⅞†	⅜	3½	¼	39,200	75,900	Intern. Agric	No	450,000		Yr. Je.'30	1.68
17	19	13	19†	5	15	3½	7,000	12,400	7% cum. prior pfd	100	100,000	7.00	Yr. Je. '30	14.58
19¼	19¼	14⅜	19¼†	6½	12½	3½	1,594,500	3,905,237	Intern. Nickel	No	14,584,000		.22	.67
19½	19½	13½	19½†	7½	11	8	26,600	38,000	Kellogg (Spencer)	No	598,000	.60		h1.14
38½	41¼	27	41½†	10½	22	9	155,000	466,000	Liquid Carbonic Corp	No	342,000		2.96	5.22
32¼	33¼	26	33½†	14	20⅞	9	88,300	261,700	Mathieson Alkali	No	650,426	1.50	1.88	2.96
...	...	...	105	100½	105	89⅜		240	7% cum. pfd	100	24,610	7.00		
58	59½	47	59½	25	30⅜	13⅜	28,700	104,366	Monsanto Chem	10	429,000	1.25	2.98	1.73
99⅛	108¼	61	108¼	16⅞	27½	13	1,158,500	1,772,800	National Dist. Prod. cts. (new)	No	252,000		—	1.23
120	121	109⅞	121†	43¼	92	45	4,500	20,600	National Lead	100	310,000	5.00		7.58
117½	117½	114	117½	101	125	87	400	3,955	7% cum. "A" pfd	100	244,000	7.00		
97½	97½	96	97½†	75	105	61	200	2,030	6% cum. "B" pfd	100	103,000	6.00		
5⅜	6½	4⅜	6½†	1⅜	4⅜	1	49,000	91,600	Tenn. Corporation	5	858,204	1.00		1.21
31½	32½	27	32½†	15½	26½	12	257,200	785,400	Texas Gulf Sulphur	No	2,540,000	2.00	3.52	5.50
41½	42⅜	38½	42⅜†	19½	36⅜	15½	402,400	1,545,300	Union Carbide & Carb	No	9,001,000	1.20	2.00	3.12
26½	27⅜	22½	27⅜†	10½	18	6⅜	115,900	399,500	United Carbon Co	No	398,000		—	1.43
61½	66½	44½	66½†	13½	36½	13½	552,200	1,078,100	U. S. Ind. Alc. Co	No	373,846		—	z2.96
25½	27⅝	21	27⅝†	7⅝	23¾	5½	323,600	653,700	Vanadium Corp. of Amer	No	378,367			2.95
3	3½	2⅞	3⅞	⅝	2⅜	⅝	44,300	115,600	Virginia Caro. Chem	No	487,000		Yr. Je. '30	Nil
14	15¼	11	15¼†	3⅜	11½	3½	15,100	45,500	6% cum. part. pfd	100	213,000		Yr. Je. '30	2.63
58	58	51	58†	35⅝	69¾	20	1,900	7,920	7% cum. prior pfd	100	145,000		Yr. Je. '30	11.96
17½	18¾	14½	18¾†	5	12⅜	1	28,200	62,200	Westvaco Chlorine Prod	No		1.00	1.79	2.51
NEW YORK CURB												
13¼	15⅞	8½	15⅞†	3¼	8½	1⅜	318,600	674,900	Amer. Cyanamid "B"	No	2,404,000		.21	
4	4½	2¼	4½†	1	2⅛	¾	19,900	28,400	Brit. Celanese Am. Rcts	2.43	2,806,000			
103¼	108¼	86½	108¼†	27	55	8	7,250	22,465	Celanese 7% cum. part. 1st pfd	100	148,000	7.00		
...	86½	80	86½	51	64½	17	1,925	6,920	" 7% cum. prior pfd	100	115,000	7.00		
15	16⅜	8	16⅜†	2	5⅜	1⅛	19,500	32,900	Celluloid Corp	No	195,000			
8¼	8½	6¼	8½†	4¼	6⅜	4½	34,400	38,800	Courtaulds, Ltd	1£				
58	59½	52	59½†	30	39	21⅛	13,100	23,600	Dow Chemical	No	630,000	2.00		3.44
2	2¼	1	2½	½	1½	½	8,700	17,600	Duval Texas Sulphur	No	500,000			
15	17	13½	17†	8	...	...	1,200	3,300	Heyden Chemical Corp	10	150,000	1.00		
...	5¼	5	5¼†	4¼	2¼	2½	500	1,000	Imperial Chem. Ind	1£			1.21	
15⅛	16½	11⅛	16½	8	20⅛	6¼	3,850	19,750	Shawinigan W. & P	No	2,178,000	1.00		
CLEVELAND STOCK EXCHANGE												
22½	24	22	24†	22	25	21⅜	260	589	Cleve-Cliffs Iron $5 pfd	No	498,000	5.00	—	11.42
...	59	55	59†	30	40	21½	740	8,631	Dow Chemical Co	No	630,000	2.00		3.44
...	98⅛	98	98⅛†	96	...	...	122	225	Dow Chemical Co., pfd	100	3,000,000	7.00		
...	132½	125	132½†	110	...	...	539	1,592	National Carbon, pfd	100	5,600,000	7.00		
PHILADELPHIA STOCK EXCHANGE												
...	46	40	46	25¼	40	19⅞	875	2,760	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30	7.97

1933 June Last	1933 High	1933 Low	1932 High	1932 Low	Sales In June	Sales During 1933	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE											
91	94½	89	94½†	70½	80	62	46	250	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
83½	84½	79	84½†	64	80	54½	472	1,861	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
...	13	8	13†	2½	18	1	200	590	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
67	74½	65	74½	37	60	34½	34	257	By-Products Coke Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
...	103½	102½	104½	101	104⅝	100⅜	38	284	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
...	59	58½	59†	38½	54⅝	32	10	187	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
9½	13	8½	13½	2½	15½	¼	1,083	26,416	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
87⅝	98½	96	98½	97½	97⅜	67	132	481	Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
...	45	39½	62	38	59	17	35	245	Ruhr chemical s. f. 6s	1948	6	A. O.	3,578,000
...	97½	94¼	97½†	87†	90	66	194	609	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
70	76	67	76†	50	66	39	18	186	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
67	71½	63	71½†	34½	75	30	213	1,107	Vanadium Corp. conv. 5s	1941	5	A. O.	5,000,000
NEW YORK CURB												
69½	70½	61½	70½†	49	76	55	494,000	2,214,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
...	70½	61½	70½†	50	76	55	164,000	1,045,000	4½s., series "B"	1968	4½	M. N.	16,108,000
...	101½	101½	...	...	103½	99	1,000	66,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30 w 13 mos.; Before inventory adjustment; *New Low; †New High

ADVERTISING PAGES REMOVED

The Trend of Prices

Business Moves Forward

Desperate quest of some 126 million Americans for that elusive something termed "recovery"—a weary and devastating quest of more than 36 long months duration—appeared happily ended in June, after many enervating false starts. Business indices, reading more like good fairy tales than cold statistics charting the course of trade, reveal a remarkable and astonishing form reversal. They show conclusively that the rise of business from the depths of despair reached so dramatically on Saturday, March 4, when every bank from Maine to California was shut tight by a panicky public's distrust of the future, to a point where a million and a quarter or more have already left the ranks of the unemployed and public confidence has been completely restored (all within a period of a little more than 100 ordinary working days), is without parallel in the history of this or any other country. Master manipulation of mob psychology; a new set of theories and practices that might be loosely termed "state capitalism" instead of the "New Deal"—these or other reasons, such as the inexorable working of the supposedly immutable law of supply and demand, can be assigned and debated as the major causes for recovery, but that it is here at last seems now certain to all but a few.

The pace of trade recovery is astonishing. Buying has suddenly developed in many lines where manufacturers have been caught napping and are now desperately trying to speed up production. We seem generally to be back to 1930 levels. May automotive sales, encouraging to say the least, have been exceeded by June. Steel production continues to mount week by week and is now at better than 50%, against an all-time low of 10% in the first weeks of March. Electrical power output is the largest since 1929. Coal output is growing as industrial activity increases. Business failures have dropped to the lowest point since October, 1929 and carloadings show steady week-to-week improvement.

Retail buying reports coming in from every section of the country indicate that there has been no let-up in the demand by consumers for goods although the usual seasonal trend in retail buying is down at this period. Wholesalers, afraid for months to carry adequate stocks, are, in some instances, and in some items, literally begging manufacturers for stocks. Textile trade is extremely busy. Glass, paint, lacquer and varnish, paper, and tanning industries, all large chemical consuming industries, are without exception now experiencing real trade revival. Even items that might be classed as luxuries or semi-luxuries are feeling the effect of prevailing optimism. Sale of electrical refrigerators in May exceeded any other month in the history of the industry (212,770 against 240,560 in the first four months of 1933).

In the commodity markets prices continued to register marked advances. Dollar wheat was greeted in the Chicago Grain-Pit with a reception rivaling that of Armistice Day. Cotton reached the best levels since July, 1931. The metal markets were specially active with copper closing at 8½c against a low of 5c; tin at 45⅜c against 19¼c a year ago. Zinc, lead and silver prices at the close of the month showed corresponding sharp rises. All of the well-known commodity price indices confirm the general rise in wholesale prices. Fisher's Index shows a net gain of 3.9 points in the period between May 26 and June 30; *The N. Y. Journal of Commerce's* Index shows a gain of 5.7 points between May 27 and July 1.

Another widely accepted index of business—*The N. Y. Times* Index of Business Activity—continued through June to show sharp weekly advances, and is now back at a level corresponding with June and July of 1930. Following table gives combined index and its component series, which are adjusted for seasonal variation and, technically, for long-time trend. Number without cotton forwardings is included:

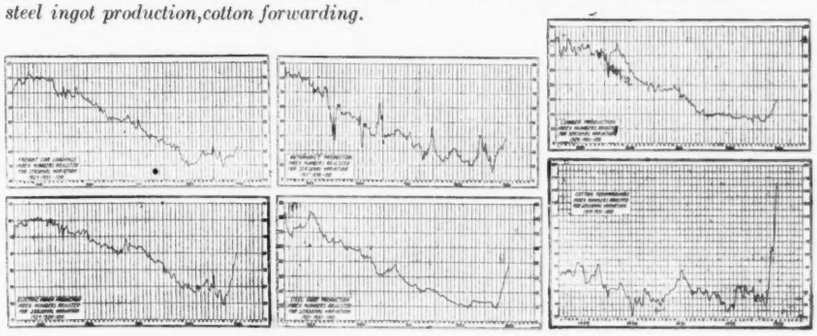
	——Weeks Ended——		
	June 24 1933	*June 17 1933*	*June 25 1932*
Combined Index	**93.8**	**91.4**	**65.0**
Without Cotton F'dgs.	81.6	79.8	....
Freight car loadings	62.7	60.6	51.6
Steel Mill activity	72.6	68.4	22.5
Electric power output	94.8	94.0	84.4
Automobile production	57.2	54.1	41.7
Lumber production	60.7	57.6	38.7
Cotton forwardings	262.2	251.3	64.9

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, May	218,171	180,667	184,295
–†Brokers Loans, June 28	$764.	$775	$342
*Building Contracts, May	$77,171	$56,573	$146,221
–*Car Loadings, June 24	604	587	498
†Commercial Paper, May 31	$60	$64	$111
–†Elec. output., kwh., June 24	1,598	1,578	1,440
Payrolls, May	42.0	38.6	46.2
Failures, Dun, May	1,900	1,921	2,788
*Merchandise Imports, May	$107,000	$88,000	$112,276
*Merchandise Exports, May	$114,000	$105,000	$131,899
Furnaces in Blast, %, June 1	22.1	16.8	18.6
*Steel Orders, May 31	1,929	1,864	2,177

*000 omitted. †000.000. –Weeks, not months.

Because they are more nearly current than the monthly U. S. Dept. of Commerce charts the following indices by the N. Y. Times *have been substituted. Reading left to right, top, freight car loadings, automobile production, lumber production, electric power production, steel ingot production,cotton forwarding.*



Better Tonnages

The chemical industry has, of course, shared generously in the present awakening of trade and industry from its "Rip Van Winkle slumber." Tonnages are up anywheres from 25 to 50% and in some instances even greater volume is reported. Prices of industrial chemicals, while showing extremely modest advances, when compared to the more active commodities actively traded in, have moved forward and the outlook is for much better and more profitable levels for 1934. The more speculative items (fat and oils, shellac, naval stores, etc.,) naturally have moved ahead at an accelerated pace. This condition is indicated by the National Fertilizer Association indices:

Group	*Latest Week June 24 1933*	*Preceding Week*	*Month Ago*	*Year Ago*
Fuel	52.6	49.2	48.2	67.6
Grains, feeds and livestock	48.3	47.5	48.6	43.1
Textiles	58.6	56.3	52.9	39.4
Automobiles	84.4	84.4	84.4	87.7
Building materials	72.2	71.9	71.6	72.1
Metals	75.0	73.7	71.5	71.0
Fats and oils	51.8	49.9	51.0	35.0
Chemicals and drugs	87.9	87.9	87.2	87.6
Fertilizer materials	64.1	64.1	64.3	68.0
Mixed fertilizer	65.7	65.7	65.9	71.9
All groups comb.	62.7	61.2	60.1	60.5

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1932 Average $1.64 - Jan. 1932 $1.54 - June 1933 $1.58

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31
Acetamide.....lb.	.95	1.35	.95	.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	...	.26	.20	.26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks.....lb.	.08	.08½	.08	.10	...	.10
Acetone Oil, bbls NY.....gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).....						
Acids						
Acid Abietic.....	....	.06	.06	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks .....100 lb.	....	2.91	2.65	2.91	2.40	2.75
Glacial, bbl c-1 wk....100 lb.	....	10.02	9.14	10.02	8.35	9.14
Adipic.....	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85	.95
Technical, bbls.....lb.	.65	.70	.65	.70	.65	.70
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. .....lb.	.0425	.05	.0425	.05	.0425	.07
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric.....lb.	....	5.25	...	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.....lb.	.11½	.12½	.11½	.12½	.11½	.14½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....lb.	.29	.30	.29	.30	.29	.33½
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY..gal.	.38	.40	.38	.41	.40	.47
97-99%, pale drs NY.....gal.	.40	.42	.40	.44	.42	.50
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums..lb.	....	.35	...	.35	.....	.....
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60	.70
USP, bbls.....lb.	....	.74	...	.74	.....	.74
Gamma, 225 lb bbls wks.....lb	.77	.79	.75	.79	.75	.80
H, 225 lb bbls wks.....lb.	.65	.70	.60	.70	.60	.65
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.59	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic.....						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	....	.06	...	.06	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.37	.36	.37	.36	.42
Linoleic.....lb.	.16	.16	.16	.16	.16	.16
Maleic, cry. kegs.....lb.	....	.35	...	...	...	...
Malic, powd, kegs.....lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls.....lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric.....						
tanks wks.....N unit	.06½	.07½	.06½	.07½	.07	.07½
tanks wks.....S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.55	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	....	1.35	...	1.35	.....	1.35
tanks, wks.....100 lb.	....	1.00	...	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	...	1.45	.....	1.45
N & W, 250 lb bbls.....	.85	.95	.85	.95	.85	.95
Naphthionic, tech, 250 lb.....	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks.....100 lb.	....	5.00	...	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	....	6.00	...	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11½	.11	.11½
Phosphoric 50%, U. S. P.....lb.	....	.14	...	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	...	.14	.....	.14
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.....lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals.....						
.....lb.	1.40	1.45	1.40	1.45	1.45	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.....	.....
Sulfanilic, 250 lb. bbls.....lb.	.15	.17	.15	.17	.14½	.16

*Credit of 1c gal on 3 carlots or more.
†Anhydrous 5c higher. ‡From grain 5c higher.

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	....	15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	....	18.50	....	18.50	.....	18.50
40%, 1c-1 wks net.....ton	....	42.00	....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	....	.22½	.20	.22½	.20	.25½
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.85	.75	.85
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	.....	2.75
Kegs.....lb.	....	1.75	....	1.75	.....	2.00
Tungstic, bbls.....lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls..lb.	.35	.43	.35	.43	.35	.40
dark.....bbls., lb.	.10	.17	.10	.17	10	.20
Egg, edible.....lb.	.81	.83	.74	.83	.75	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible.....lb.	.65	.70	.60	.70	.60	.65
Technical.....lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks.....lb.	....	.10½	....	.10½	.123	.1505
Drums, 1-c-1 wks.....lb	....	.11	....	.11	.128	.1645
Tank cars wks.....lb.	....	.09½	....	.09½	.113	.143
Secondary tank .....lb.	....	.076	....	....	.....	....
drums carlots .....lb.	....	.086	....	....	.....	....
Amyl (from pentane) Tanks wks .....lb.	....	.143	.143	.176	.176	.203
Capryl, tech, drums.....lb.	....	.85	....	.85	.....	.85
Diacetone, tanks.....lb.	.15¾	.16¼	.15¾	.16¼	.....	.....
Ethyl, USP, 190 pf, 50 gal. bbls‡.....gal.	2.41½	2.58½	2.41½	2.65	2.55	2.65
No. 5. *188 pf, 50 gal. drs. drums extra†.....gal.	....	.385*	....	.385*	.27	.396
No. S. D. 1, tanks .....gal.	....	.304	....	.304	.....	.....
Furfuryl, tech., 500 lb. drs.lb	....	.40	.40	.45	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.....	.75
Isopropyl, ref, gal drs.....gal.	.45	.50	.45	.50	.45	.65
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls.....lb.	.65	.70	.65	.70	.57	.65
Alpha-Naphthylamine, 350 lb. bbls.....lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks.....100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks .....100 lb.	4.50	5.25	4.50	5.25	4.50	5.25
Potash, lump, 400 lb casks wks.....100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks.....100 lb	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.00	24.30	22.90	24.30
Chloride Anhydrous .....lb.	.04	.08	.04	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls.....lb.	.15	.16½	.15	.16½	.15	.17
Stearate, 100 lb bbls.....lb.	.13½	.17	.12½	.17	.15	.21
Sulfate, Iron, free, bags c-1 wks.....100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	....	.05	....	.05	.05	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont.....	....	.05	.....	.05	.....	.....
Ammonium Acetate .....lb.	.26	.33	.26	.33	.26	.39
Bicarbonate, bbls., f.o.b. plant .....100 lb.	....	5.15	....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.14½	.17	.14½	.17	.14½	.22
Carbonate, tech, 500 lb cs..lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks .....100 lb.	4.45	4.90	4.45	4.90	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb oks spot...lb.	.10	.11	.10	.11	.10½	.11½
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15	.16
Linoleate.....lb.	....	.11	....	.11	.11	.15
Nitrate, tech, casks.....lb.	.06	.10	.06	.10	.06	.10
Oleate, drs.....lb.	....	.10	....	.10	.....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.27½
Phosphate, tech, powd, 325 lb. bbls.....lb.	.08½	.11½	.08½	.11½	.08½	.12
Sulfate, bulk c-1.....100 lb.	....	1.08	1.00	1.20	.90	1.40
Sulfocyanide, kegs.....lb.	.36	.48	.36	.48	.36	.48

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Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Amyl Acetate, (from pentane) Tanks del. lb.	....	.13½	...	.13½	.15⅞	.17½
Tech., drs del. lb.	.142	.149	.138	.149	.17½	.18
Amyl Alcohol, see Fusel Oil						
Aniline Oil, 960 lb drs & tks. lb.	.14½	.16	.14½	.16	.14½	.16
Annatto, fine lb.	.34	.37	.34	.37	.34	.37
Anthraquinone, sublimed, 125 lb. bbls lb.	....	.45	...	.45	.45	.55
Antimony, metal slabs, ton lots lb.	....	.06½	.05⅝	.06½	.05	.06½
Needle, powd, bbls lb.	.07	.08	.07	.08	.08½	.09
Chloride, soln (butter of) cbys lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls lb.	.07½	.08¾	.07½	.08¾	.07½	.08¾
Salt, 63% to 65%, tins lb.	.20	.23	.20	.23	.20	.24
Sulfuret, golden, bbls lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls lb.	.20	.21	.20	.21	.17	.21
Double, 600 lb bbls lb.	.16	.17	.16	.17	.16	.17
Triple, 600 lb bbls lb.	.16	.17	.16	.17	.16	.17
Argols, 80%, casks lb.	.12½	.13	.12	.13	.12½	.13
Crude, 30%, casks lb.	.06½	.07½	.06½	.07½	.07	.07½
Aroclors, wks lb.	.18	.30	.18	.30	.18	.40
Arrowroot, bbl lb.	.08½	.08¾	....	....	....	....
Arsenic, Red. 224 lb kegs, cs. lb.	.11¼	.12½	.09⅜	.12½	.09⅜	.10
White, 112 lb kegs lb.	.04	.05	.04	.05	.04	.05
Asbestine, c-l wks ton	13.00	15.00	13.00	15.00	.....	15.00

Barium

Barium Carbonate, precip, 200 lb. bags wks ton	56.50	58.50	56.50	58.50	47.00	57.00
Nat. (witherite) 90% gr. carlots wks bags ton	.....	40.00	.....	.....	.....	.....
Chlorate, 112 lb kegs NY lb.	.15	.16	.13¾	.16	.13¾	.15
Chloride, 600 lb bbl wks. ton	61.50	65.00	61.50	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls lb.	.04½	.05	.04½	.05	.04¾	.05½
Nitrate, 700 lb casks lb.	.....	.07½	...	.07½	.07	.08
Barytes, Floated, 350 lb bbls wks ton	22.20	30.50	22.20	30.50	22.00	24.00
Bauxite, bulk, mines ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags lb.	.14	.15	.14½	.16	.....	.....
Beeswax, Yellow, crude bags lb.	.17	.18	.13	.18	.14½	.24
Refined, cases lb.	.22	.26	.18	.26	.20	.28
White, cases lb.	.32	.35	.30	.35	.30	.36
Benzaldehyde, technical, 945 lb. drums wks lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks gal	.....	.22	.20	.22	.....	.20
Ind. Pure, tanks works gal	.....	.22	.20	.22	.....	.20
Benzidine Base, dry, 250 lb. bbls lb.	.65	.67	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs. lb.	.40	.45	.40	.45	.40	.47
Benzyl Chloride, tech drs lb.	.....	.30	...	.30	.....	.30
Beta-Naphthol, 250 lb bbl wk lb.	.....	.22	...	.22	.....	.22
Naphthylamine, sublimed, 200 lb bbls. lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.53	.58	.53	.58	.53	.58
Bismuth, metal	....	.95	.85	.95	.....	.....
Bismuth Subnitrate	....	1.10	.95	1.10	.....	.....
Blanc Fixe, 400 lb bbls wks. ton	42.50‡	65.00	42.50	75.00	.....	.....
Bleaching Powder, 800 lb drs c-l wks contract 100 lb.	1.75	2.00	1.75	2.00	1.75	2.00
Blood, Dried, fob, NY Unit	2.25	2.35	1.55	2.35	1.20	1.90
Chicago, high grade Unit	.....	1.90	....	....	....	....
S. American shipt Unit	.....	2.50	1.90	2.50	2.00	2.25
Blues, Bronze Chinese Milori Prussian Soluble lb.	.....	.35	....	.35	.....	.35
Bone, raw, Chicago ton	26.00	28.00	19.00	28.00	20.00	22.00
Bone Ash, 100 lb kegs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.05½	.08½	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, Imp. ton	.....	23.50	18.00	25.00	20.00	23.00
Borax, bags lb.	.018	.02	.018	.02	.018	.03¼
Bordeaux, Mixture, 16% pwd. lb.	.08½	.10½	.11½	.10½	.11½	.13
Paste, bbls lb.	.08½	.13	.10½	.13	.11½	.13
Brazilwood, sticks, shpmt lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk. lb.	.50	.75	.50	.75	.60	1.20
Gold bulk lb.	.40	.55	.40	.55	.55	1.25
Butanes, com 16.32° group 3 tanks lb	.....	.04	.02¾	.04	.....	.....
Butyl, Acetate, normal drs. lb	.....	.11	.11	.139	.134	.166
Tank, wks. lb	.....	.10	.10	.124	.124	.143
Secondary tanks, wks. lb	....	.08	....	....	....	....
Aldehyde, 50 gal drs wks. lb.	.31½	.36	.31½	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)	.....	.....	....	....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)	.....					
Furoate. tech.. 50 gal. dr. lb.	.....	.60	.50	.60	.....	.50
Lactate, drums lb.	....	.29	....	....	....	....
Propionate, drs lb.	.20	.22	.20	.22	.20	.25
Stearate, 50 gal drs. lb.	.25	.25½	.25	.25½	.25	.25½
Tartrate, drs lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes lb.	.65	.75	.65	.75	.65	.90
Calcium, Acetate, 150 lb bags c-l 100 lb	.....	3.00	2.50	3.00	2.00	2.50
Arsenate, 100 lb bbls c-l wks lb	.....	.07	.05½	.07	.05½	.06
Carbide, drs lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-l lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-l wks ton	.....	19.50	19 50	21.00	.....	21.00
Solid, 650 lb drs c-l fob wks ton	.....	17.50	17.50	18.00	.....	18.00

†F. O. B. destination, 1931 prices are works prices.
‡Lowest price is for pulp; highest for high-grade precipitate.

Current

Calcium Furoate
Cresol

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Calcium Furoate, tech, 100 lb. drums lb.		.30	.30		.30
Nitrate, 100 lb bags ton	24.50	26.00	24.00 26.00	34.00	35.00
Palmitate, bbls lb.	.17	.19	.16 .19		
Peroxide, 100 lb drs lb.		1.25	1.25		1.25
Phosphate, tech, 450 lb bbls lb.	.07½	.08	.07½ .08	.07½	.08½
Resinate, precip., bbls lb.	.13	.14			
Stearate, 100 lb. bbls lb.	.15	.17	.12½ .17	.16	.18
Camphor, slabs lb.		.45	.35½ .45		
Powder lb.		.42	.38 .43		
Camwood, Bark, ground bbls lb.	.16	.18	.16 .18	.16	.18
Candelilla Wax, bags lb.	.09½	.10	.09 .11	.10	.14
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)					
Carbon, Decolorizing, drums c-1 lb.	.08	.15	.08 .15	.08	.15
Black, 100-300 lb cases 1c-1 NY lb.	.06	.12	.06 .12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY lb.	.05½	.06	.05½ .06	.05½	.06
Dioxide, Liq. 20-25 lb cyl lb.		.06	.06		.06
Tetrachloride, 1400 lb drs delivered lb.	.05½	.06	.05½ .07	.06½	.07
Carnauba Wax, Flor, bags lb.		.32	.23 .31	.23	.28
No. 1 Yellow, bags lb.		.30	.20 .30	.21	.24
No. 2 N Country, bags lb.		.18	.14 .18	.13	.16
No. 2 Regular, bags lb.		.29	.20 .29	.20	.24
No. 3 N. C. lb.		.13	.11½ .16	.11	.13
No. 3 Chalky lb.		.13	.12 .13½	.11	.13
Casein, Standard, Domestic ground lb.		.12	.06½ .12	.04½	.07½
80-100 mesh carlots, bags lb.		.12½			
Cellosolve (see Ethylene glycol mono ethyl ether)					
Acetate (see Ethylene glycol mono ethyl ether acetate)					
Celluloid, Scraps, Ivory cs lb.	.13	.14	.13 .15	.13	.15
Shell, cases lb.	.18	.20	.18 .20	.18	.20
Transparent, cases lb.		.16	.16		.15
Cellulose, Acetate, 50 lb kegs lb.	.80	.90	.80 .90	.80	.90
Chalk, dropped, 175 lb bbls lb.	.03	.03½	.03 .03½	.03	.03½
Precip, heavy, 560 lb cks lb.	.02	.03½	.02 .03½	.02	.03½
Light, 250 lb casks lb.	.02½	.03½	.02½ .03½	.02½	.03½
Charcoal, Hardwood, lump, bulk wks bu.	.18	.19	.18 .19	.18	.19
Willow, powd, 100 lb bbl. wks lb.	.06	.06½	.06 .06½	.06	.06½
Wood, powd, 100 lb bbls lb.	.04	.05	.04 .05	.04	.05
Chestnut, clarified bbls wks lb.	.01⅝	.02	.01⅝ .02	.01⅝	.02
25% tks wks lb.		.01½	.012 .01½	.01½	.02½
Powd, 60%, 100 lb bgs wks lb.		.04½	.04½		.04½
Powd, decolorized bgs wks lb.	.04⅞	.05	.04⅞ .05	.04⅞	.06
China Clay, lump, blk mines ton	8.00	9.00	8.00 9.00	8.00	9.00
Powdered, bbls lb.	.01	.02	.01 .02	.01	.02
Pulverized, bbls wks ton	10.00	12.00	10.00 12.00	10.00	12.00
Imported, lump, bulk ton	15.00	25.00	15.00 25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract lb.	.07	.08½	.07 .08½	.07	.08½
cyls, cl., contract lb.		.05½†	.05½		.05½
Liq tank or multi-car lot cyls wks contract 100 lb.		1.75	1.75	1.55	1.75
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks lb.	.06	.07½	.06 .07½	.06	.10½
Chloroform, tech, 1000 lb drs lb.	.15	.16	.15 .16	.15	.16
Chloropicrin, comml cyls lb.	.90	1.25	.90 1.35	1.00	1.35
Chrome, Green, CP lb.	.23	.29	.23 .29	.23	.29
Commercial lb.	.06½	.10	.06½ .10	.06½	.11
Yellow lb.	.14	.15	.14 .15	.14	.18
Chromium, Acetate, 8% Chrome bbls lb.	.05	.05½	.04½ .05½	.04½	.05½
20° soln, 400 lb bbls lb.		.05½	.05½		.05½
Fluoride, powd, 400 lb bbl lb.	.27	.28	.27 .28	.27	.28
Oxide, green, bbls lb.	.28	.33	.28 .33	.28	.35½
Coal tar, bbls bbl.	8.00	9.00	8.00 9.00	10.00	10.50
Cobalt Acetate, bbls lb.	.75	.80			
Carbonate tech., bbls lb.	1.34	1.40			
Hydrate, bbls lb.	1.66	1.76			
Linoleate, paste, bbls lb.	.39	.40			
Resinate, fused, bbls lb.		.12½			
Precipitated, bbls lb.		.41	.42		
Cobalt Oxide, black, bags lb.	1.15	1.25	1.15 1.25	1.15	1.45
Cochineal, gray or black bag lb.	.36	.42	.36 .42	.38	.57
Teneriffe silver, bags lb.	.37	.43	.37 .43	.39	.57
Copper, metal, electrol 100 lb.		8.00	5.00 8.00	5.05	7.25
Carbonate, 400 lb bbls lb.	.07	.15½	.07 .15½	.07	.16½
Chloride, 250 lb bbls lb.	.17	.18	.17 .18	.17	.25
Cyanide, 100 lb drs lb.	.39	.40	.39 .40	.39	.40
Oleate, precip., bbls lb.		.20			
Oxide, red, 100 lb bbls lb.	.14¾	.15	.14¾ .15	.15	.16
Resinate, precip., bbls lb.	.18	.19			
Stearate, precip., bbls lb.	.35	.40			
Sub-acetate verdigris, 400 lb bbls lb.	.18	.19	.18 .19	.18	.19
Sulfate, bbls c-1 wks 100 lb.		3.50	3.00 3.50	2.75	3.10
Copperas, crys and sugar bulk c-1 wks bags ton	14.00	14.50	14.00 14.50	14.00	14.50
Corn Syrup, 42 deg., bbls. 100 lb.		2.73	2.61 2.73		
43 deg., bbls 100 lb.		2.78	2.66 2.78		
Cotton, Soluble, wet, 100 lb bbls lb.	.40	.42	.40 .42	.40	.42
Cottonseed, S. E. bulk c-1 ton		26.50	26.50		26.50
Meal S. E. bulk ton					
7% Amm., bags mills ton	13.25	38.00	13.25 38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls lb.		.15½	.14½ .15½	.15½	.20½
Creosote, USP, 42 lb cbys lb.	.45	.47	.40 .47	.40	.42
Oil, Grade 1 tanks gal.	.11	.12	.11 .12	.11	12½
Grade 2 gal.	.10	.12	.10 .12	.10	.11½
Grade 3 gal.	.09	.12	.09 .12	.09	.11½
Cresol, USP, drums lb.	.10½	.11	.10½ .11	.10½	.11

• *1933 Onward Toward Our 100th Anniversary* •

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Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Crotonaldehyde, 50 gal dr....lb.	.32	.36	.32	.36	.32	.36
Cudbear, English.....lb.	.19	.25	.16	.25	.16	.17
Cutch, Rangoon, 100 lb bales.lb.....		.02½	.02½	.03	.08¾	.12
Borneo, Solid, 100 lb bale...lb.....		.03¾	.02½	.03¾	.03	.07
Cyanamide, bags c-l frt allowed Ammonia unit.....		1.02½	.97½	1.02½	.	.97½
Dextrin, corn, 140 lb bags.100 lb.	3.29	3.49	2.89	3.49	2.99	3.67
British Gum, bags .....100 lb.	3.54	3.74	....	....	....	....
White, 140 lb bags.....100 lb.	3.24	3.44	2.94	3.44	2.94	3.37
Potato Yellow, 220 lb bgs..lb.	.07¾	.08¾	.07¾	.09	.08	.09
White, 220 lb bags lc-l....lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags lc-l...lb.	.06¾	.07¾	.06¾	.08	.07	.08¾
Diamylether, wks., drums....lb.....		.60	....	....	.....	.....
Diamylphthalate, drs wks...gal.....		.20½	....	....	.....	.....
Dianisidine, barrels.....lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks.....lb.	.20½	.21	.20½	.22	.218	.23½
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.21	.29½	.31½
Dichloroethylether, 50 gal drs lb.....		.16	....	.16	.....	.16
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.55	.65
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, com. drs..gal.....		.31¾	....	....	....	.....
Diethylaniline, 850 lb drs....lb.	.52	.55	.52	.55	.55	.60
Diethyleneglycol, drs.....lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.....		.26	....	.26	.24	.30
Diethylene oxide, 50 gal drs..lb.	.26	.27	.26	.27	.....	.....
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums.....lb.....		.20	.20	.26	.23	.26
Diethylsulfate, technical, 50 gal drums.....lb. ...		...	....	....	.30	.35
Digtycol Oleate, bbls.....lb.....		.16	....	....	.....	.....
Dimethylamine, 400 lb drs, pure 25 & 40% sol. 100% basis..lb.....		1.20	....	....	.....	....
Dimethylaniline, 340 lb drs...lb.	.26	.28	.25	.28	.25	.27
Dimethyl phthalate drs.....lb.....		.24½	....	....	.....	.....
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.....		.18	....	.18	.15	.16
Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls....lb.	.15	.16	.15	.17	.16	.17
Dioxan (See Diethylene Oxide).....	.....	....	....	....	.....	.....
Diphenyl.....lb.	.15	.25	.15	.40	.20	.40
Diphenylamine.....lb.	.31	.34	.31	.34	.34	.37
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.30	.35
Dip Oil, 25%, drums.....lb.	.23	.25	.23	.25	.26	.30
Divi Divi pods, bgs shipmt..ton	27.00	27.50	26.00	29.00	26.00	30.00
Extract.....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases .....lb.....		.43	.40	.43	.40	.52
Epsom Salt, tech, 300 lb bbls c-l, NY... .....100 lb.....		2.20	....	2.20	1.70	1.90
Ether, USP anaesthesia 55 lb. drs. .....lb.	.22	.23	.22	.23	.22	.23
(Conc).....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums ...lb.	.07‡	.08	.07	.08	.....	.....
Synthetic, wks, drums.....lb.	.08	.09	....	....	.....	.....
Ethyl Acetate, 85% Ester tanks.....lb.	.07½	.08	.07½	.09	.08½	.09
drums.....lb.	.08½	.09	.08½	.10	.09½	.10
Anhydrous, tanks.....lb.	.09	.10	.09	.10	.....	.10
drums.....lb.	.10	.10½	.10	.10½	.....	.10½
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums.....lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums.....lb.....		.22	....	.22	.....	.22
Chlorocarbonate, cbys.....lb.....		.30	....	.30	.....	.30
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.....lb.....		1.00	1.00	5.00	....	5.00
Lactate, drums works ...lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.....		.12½	....	.12½	.....	.30
Oxalate, drums works.....lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks lb.	.30	.30½	.30	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont.....lb.	.75	.85	.75	.85	.7	.85
Dichloride, 50 gal drums....lb.	.05	.09	.05	.09	.0595	.07
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks.....		.20	....	.20	.20	.24
Mono Ethyl Ether drs wks	.15	.17	.15	.17	.15	.20
Mono Ethyl Ether Acetate dr. wks.....lb.	.16½	.18	.16½	.18	.16½	.23
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate.....	.18	.18	.18	.18	.18	.18
Oxide, cyl.....lb.....		.75	....	.75	.75	2.00
Ethylidenaniline.....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery .....ton	14.00	16.50	14.00	16.50	15.00	20.00
Powdered, bulk works....ton	13.50	14.50	13.50	14.50	15.00	21.00
Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.04½	.07	.04½	.07	.04½	.07½
Fish Scrap, dried, wks.....unit.....		2.60*	1.85	2.70*	1.60	3.00
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit.....		2.50†	1.85	2.50†	1.40	2.40
Fluorspar, 98%, bags.....28.00		35.50	28.00	35.50	28.00	46.00

*& 10; †& 50

Formaldehyde

Formaldehyde, aniline, 100 lb.....	.....	....	....	....	.....	.....
drums.....lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks.....lb.	.06	.07	.06	.07	.06	.07½
Fossil Flour.....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-l bags.....ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,..lb.	.10§	.15	.10	.15	.....	.10
Furfuramide (tech) 100 lb dr..lb.....		.30	....	.30	.....	.30
Furfuryl Acetate, 1 lb tins....lb.....		5.00	....	5.00	.....	5.00
Fusel Oil, 10% impurities....lb.	.16	.18	.14½	.18	.....	.....

‡Higher price, refined. §Tanks, 1c lower.

Current

Fustic
Hydroxyamine

		Current Market	1933 Low	1933 High	1932 Low	1932 High
Fustic, chips	lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes	lb.	.18	.20	.18	.20	.18	.20
Liquid 50°, 600 lb bbls	lb.		.08	.07	.08	.07	.08
Solid, 50 lb boxes	lb.	.14	.16	.14	.16	.14	.16
Sticks	ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls	lb.	.42	.43	.42	.43	.42	.50
Gall Extract	lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs.	lb.	.03¾	.06½	.03	.07	.06½	.07
Singapore cubes, 150 lb bg.	lb.	.05¾	.06½	.05½	.08	.07¾	.09
Gelatin, tech, 100 lb cases	lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l wks.	100 lb.	1.00	1.70	1.00	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY	100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags	100 lb.		2.33	....	2.33	2.36	2.75
Glue, medium white, bbls	lb.	.14	.17	.12	.17	.15½	.20
Pure white, bbls	lb.	.17	.22	.18	.22	.18	.27
Glycerin, CP, 550 lb drs	lb.		.10½	....	.10½	.09¾	.11½
Dynamite, 100 lb drs	lb.	.08¼	.08¾	.07½	.08¾	.07¼	.09¾
Saponification, tanks	lb.		.05	....	.05	.04½	.06¼
Soap Lye, tanks	lb.	.04½	.04¾	.04	.04¾	.03¾	.05
Glyceryl Stearate, bbls	lb.		.18	.17	.18	.....	.17
Graphite, crude, 220 lb bgs.	ton	12.00	23.00	12.00	23.00	12.00	35.00
Flake, 500 lb bbls	lb.	.05	.06	.05	.06	.05	.09
Gums							
Gum Accroides, Red, coarse and fine 140-150 lb bags	lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags	lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags	lb.	.18	.20	.18	.20	.18	.20
Aloes, Barbadoes	lb.		.90	.85	.90	.....	.....
Animi (Zanzibar) bean & pea 250 lb cases	lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases	lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts	lb		.07	.05¾	.07	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags	lb.	.03	.06	.03	.05	.04	.06
Egyptian, 200 lb cases	lb.	.13	.15	.13	.15	.13	.15
Gamboge, pipe, cases	lb.		.52	.42	.60	.....	.....
Powdered, bbls	lb.	.60	.65	.50	.65	.....	.....
Gilsonite Selects, 200 lb bags	ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases	lb.		.12½	.08½	.12½	.08½	.09
Batavia Dust, 160 lb bags	lb.	.04½	.05½	.04	.05½	.04	.05½
E Seeds, 136 lb cases	lb.	.06	.06½	.05½	.06½	.05½	.06½
F Splinters, 136 lb cases and bags	lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases	lb.		.14½	.09½	.14½	.10½	11
No. 2, 224 lb cases	lb.		.11	.07	11	.06	.07½
No. 3, 180 lb bags	lb.		.06	.04½	.06	.04½	.05
Benzoin Sumatra, U. S. P. 120 lb. cases	lb.	.19	.22	.17	.22	.18	.22
Copal Congo, 112 lb bags, clean opaque	lb.	.21½	.22½	.16½	.22½	.16½	.17
Dark, amber	lb.	.07½	.09	.06	.09	.06	.07
Light, amber	lb.	.12	.17	.08	.17	.08	.09
Water, white	lb.	.40	.45	.37	.45	.37	.45
Kino, tins	lb.	.48	.50	....	....	.....	.....
Mastic	lb.	.29½	.30	.26½	.30	.26⅞	.40
Manila 180-190 lb baskets							
Loba A	lb.	.10½	.11½	.09	.11½	.09	.11
Loba B	lb.	.10	.11	.08	.11	.08	.08½
Loba C	lb.	.09½	.10½	.07	.10½	.07	.08
M A Sorts	lb.	.06	.06½	.05	.06½	.04½	.05
D B B Chips	lb.	.07¼	.08¼	.05¾	.08¼	.05	.06¼
East Indies chips, 180 lb bags	lb.	.04	.05	.04	.05	.04½	.05½
Pale bold, 224 lb cs.	lb.	.14	.15	.05½	.15	.06	.08
Pale nubs, 180 lb bags	lb.	.09	.11	.05	.11	.03½	.05
Pontianak, 224 lb cases							
Bold gen No. 1	lb.	.17	.18	.14	.18	.14	.16
Gen. chips spot	lb.	.06	.06½	.05	.07	.05	.08
Elemi, No. 1, 80-85 lb cs.	lb.	.10	.11	.09	.11	.09	.09½
No. 2, 80-85 lb cases	lb.	.09½	.10½	.08½	.10½	.08½	.09
No. 3, 80-85 lb cases	lb.	.08	.08½	.08	.08½	.08	.08½
Ghatti, sol. bags	lb.	.08½	.09½	.06	.09½	.....	.....
Karaya, pow. bbls xxx	lb.	.20	.23	....	....	.....	.....
xx	lb.	.16	.17	....	....	.....	.....
No. 1	lb.	.09	.12	....	....	.....	.....
No. 2	lb.	.08	.09	....	....	.....	.....
Kauri, 224-226 lb cases No. 1	lb.	.20	.25	.20	.25	.20	.42
No. 2 fair pale	lb.	.12½	.16	.12½	.16	.12½	.30
Brown Chips, 224-226 lb. cases	lb.	.06½	.08½	.06½	.12	.10	.12
Bush Chips, 224-226 lb. cases	lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases	lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb. bags & 300 lb. casks	lb.	.24½	.25	.21	.25	.23	.25½
Senegal, picked bags	lb.	.15	.16	....	....	.....	.....
Thus, bbls	280 lbs.	8.00	8.25	....	....	.....	.....
Strained	280 lbs.	8.00	8.25	....	....	.....	.....
Tragacanth, No. 1 bags	lb.		.75	.65	.75	.....	.....
Yucca, bags	lb.	.04	.05	....	....	.....	.....
Helium, 1 lit. bot.	lit.		25.00	....	25.00	.....	25.00
Hematine crystals, 400 lb bbls	lb.	.14	.18	.10	.18	.10	.18
Paste, 500 bbls	lb.		.11	....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks	lb.	.03½	.04½	.03½	.04½	.03	.04½
Bark	ton	.....	16.00	....	16.00	.....	16.00
Hexalene, 50 gal drs wks	lb.		.30	....	.30	.30	.40
Hexane, normal 60-70° C. Group 3, tanks	gal.		.11	....	....	....	....
Hexamethylenetetramine, drs	lb.	.46	.47	.46	.47	.46	.47
Hoof Meal, f.o.b. Chicago	unit	.90	1.00	.75	1.00	.75	1.35
South Amer. to arrive	unit	1.40	1.50	1.40	1.50	1.25	1.65
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride	lb.		3.15	....	3.15	.....	3.15

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◆

Acetate of Lime
Acetate of Soda
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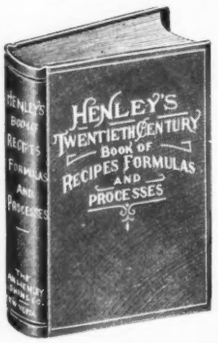

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Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Hypernic, 51°, 600 lb bbls....lb.	.11	.12	.11	.12	.11	.12
Indigo Madras, bbls.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid.....lb.....		.12	....	.12	.....	.12
Iodine, crude.....per kilo.....		£1 5s	....	....	.....	.....
Resublimed, kegs.....lb.....		3.25	2.65	3.25	.....	.....
Irish Moss, ord. bales.....lb.	.05	.06	....	....	.....	.....
Bleached, prime, bales.....lb.	.07	.08	....	....	.....	.....
Iron Chloride see Ferric or Ferrous						
Iron Nitrate, kegs.....lb.	.09	.10	.09	.10	.09	.10
Coml, bbls.....100 lb.	2.75	3.25	2.50	3.25	2.50	3.25
Oxide, English.....lb.	.04	.10	.04	.10	.04	.10
Japan Wax, 224 lb cases.....lb.....		.06½	.05½	.06¾	.06	.09
Kieselguhr, 95 lb bgs NY.....						
Brown.....ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks...100 lb.....		9.50	8.50	9.50	9.00	10.00
White crystals, 500 lb bbls wks.....100 lb.....		10.50	9.50	10.50	10.00	11.00
Arsenate, drs 1c-1 wks.....lb.	.10	.10½	.09	.10½	.09½	.13
Dithiofuroate, 100 lb dr....lb.....		1.00	....	1.00	.....	1.00
Linoleate, solid bbls.....lb.	.26	.26½	....	....	.....	....
Metal, c-l NY.....100 lb.....		4.20	3.00	4.20	2.70	3.75
Nitrate, 500 lb bbls wks....lb.	.10	.14	.10	.14	.10½	.14
Oleate, bbls.....lb.	.15	.16	.15	.16	.15	.18
Lead Oxide Litharge, 500 lb. bbls..... lb.....		.06½	.05½	.06½	.05½	.07
Red, 500 lb bbls wks....lb.....		.07½	.06½	.07½	.06½	.07
Resinate, precip., bbls...lb.	.18	.18½	....	....	.....	.....
Stearate, bbls.....lb.	.22	.23	....	....	.....	.....
White, 500 lb bbls wks...lb.	.06½	.07	.06	.07	.06	.07
Sulfate, 500 lb bbls wk...lb.....		.06	.05½	.06	.05½	.06
Leuna saltpetre, bags c.i f.....ton.....		Nom.	....	Nom.	.....	Nom.
S. points c.i.f.....ton.....		Nom.	....	Nom.	.....	Nom.
Lime, ground stone bags.....ton.....		4.50	....	4.50	.....	4.50
Live, 325 lb bbls wks....bbl.....		1.70	....	....	.....	.....
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.....gal.	.15	.17	.15	.17	.15	.17
Linseed cake, bulk.....ton.....		22.00	17.50	22.00	.....	.....
Linseed Meal.....ton.....		31.50	28.00	31.50	.....	.....
Lithopone, 400 lb bbls 1c-1 wks.....lb.	.04½	.05	.04½	.05	.04½	.05
Logwood, 51°, 600 lb bbls....lb.	.07	.10	.05	.10	.05	.08
Solid, 50 lb boxes.....lb	.12	.14	.08	.14	.08	.12½
Sticks.....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch.....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	46.00	56.00	46.00	56.00	50.00	60.00
Magnesium Carb, tech, 70 lb. bags NY.....lb.	.05½	.06½	.05½	.06½	.05½	.06½
Chloride flake, 375 lb. drs c-l wks.....ton	34.00	36.00	34.00	36.00	35.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton.....		31.00	....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls .....lb.....		.42	....	.42	.....	.42
Heavy, 250 lb bbls.....lb.....		.50	....	.50	.....	.50
Palmitate, bbls.....lb.	.19	.23	....	....	.....	.....
Peroxide, 100 lb cs.....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls.....lb.	.08¾	.09½	.08¾	.10½	.09½	.10½
Stearate, bbls.....lb.	.17	.20	.16½	.20	.16½	.26
Manganese Borate, 30%, 200 lb bbls.....lb.	.15	.16	.15	.16	.15	.19
Chloride, 600 lb casks.....lb.	.07	.08	.07	.08	.07	.08½
Dioxide, tech (peroxide) drs lb.	.03¾	.06	.03½	.06	.03½	.06
Linoleate, lig. drums.....lb.	.18	.19	....	....	.....	.....
Resinate, fused, bbls.....lb.	.08½	.08½	....	....	.....	.....
precip., bbls.....lb.	.11½	.12½	....	....	.....	.....
Sulfate, 550 lb drs NY.....lb.	.07	.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.....		.04	....	.04	.....	.04
Bark, African.....ton	26.00	27.00	22.00	27.00	21.00	25.00
Marble Flour, bulk.....ton	12.00	13.00	12.00	13.00	12.00	15.00
Mereurous chloride.....lb.....		.72	.67	.72	.67	.93
Mercury metal.....76 lb flask	61.50	62.50	48.00	62.50	47.00	74.50
Meta-nitro-aniline.....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls.....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls.....lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol).....						
*Crude, tanks.....gal.....		.20	.20	.20	.....	.....
95% tanks.....gal.	.33	.35	.33	.35	.33	.35
97% tanks.....gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars gal.....		.39½	.37½	.39½	.37½	.41½
*Synthetic tanks.....gal.....		.35½	....	.35½	.....	.35½
*Denat. grade, tanks.....gal.....		.40	.35	.40	.....	.....
Methyl Acetate drums 82% gal.	.12	.13	.12	.13	.12	.17½
99%.....gal.....		.15	....	.15	.....	.15
Acetone, drums.....gal.	.54	.56	.42	.56	.47	.55
Hexyl Ketone, pure.....lb.....		1.20	....	1.20	.....	1.20
Anthraquinone.....lb.	.65	.67	.65	.67	.65	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether).....		.....	....	....	.....	.....
Chloride, 90 lb cyl.....lb.	.45	.45	.45	.45	45	.45
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs.....lb.....		2.50	2.50	3.00	.....	3 00
Molasses, blackstrap, tanks f.o.b. N. Y.....gal.....		.05	.05	.05	.....	.....
Monochlorobenzene, drums see, Chlorobenzene, mono.....lb.						
Monomethylparaminosulfate 100 lb drums.....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.	.06½	.06¾	.03¾	.06¾	.03¾	.07
Myrobalans 25%, liq bbls....lb.	.03¾	.04¼	.03¾	.04¼	.03¾	.04¼
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05	.05½

*delivered basis (east of Miss. River)

	Current Market	1933 Low	1933 High	1932 Low	1932 High
J1 bags ton	27.00	28.00	27.00	35.00	34.00	35.00
J2 bags ton	.....	21.00	15.50	21.00	15.25	18.50
R2 bags ton	.....	20.50	15.00	20.50	14.75	17.50
Naphtha. v.m.& p. (deodorized) tanks, Group 3 tanks gal.	.05½	.06	....	....	.....	.....
Bayonne, tanks lb.	.....	.09	.08½	.09	.08½	.10
Naphthalene balls, 250 lb bbls wks lb.	.05½	.06½	.05½	.06½	.03¾	.05½
Crushed, chipped bgs wks lb.	.....	.04½	....	.04½	.....	.04½
Flakes, 175 lb bbls wks lb.	.....	.04¼	....	.04¼	.03¾	.04¼
Nickel Chloride, bbls lb.	.17	.18	.17	.18	.18	.20
Oxide, 100 lb kegs NY lb.	.35	.37	.35	.37	.35	.40
Salt bbl. 400 bbls lb NY lb.	.12	.13	.11	.13	.10½	.13
Single, 400 lb bbls NY lb.	.12	.12	.11	.12	.10½	.12
Metal ingot lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases	8.25	10.15	....	....	.....	.....
Sulfate, 55 lb. drums lb.	.94	1.17	.74½	1.17	.74½	.....
Nitre Cake, bulk ton	10.00	12.00	10.00	12.00	10.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks lb.	.09	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks lb.	.27	.33	.27	.33	.25	.36
Nitrogenous Material, bulk unit	.....	2.05	1.50	2.05	1.35	1.55
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	....	25
Nitrotoluene, 1000 lb drs wks lb.	.17	.18	.14	.18	.14	.15
Nutgalls Aleppy, bags lb.	.....	.18	....	.18	.....	.18
Chinese, bags lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tannin, bbls. lb.	.03¾	.03½	....	....	.....	.....
Orange-Mineral, 1100 lb casks NY lb.	.....	.11	.10½	.11	.09½	.10¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.1	2.25
Orthoanisidine, 100 lb drs lb.	1.00	1.15	1.00	1.15	1.15	1.50
Orthochlorophenol, drums lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums lb.	.13	.15	.13	.15	.13	.22
Orthodichlorobenzene, 1000 lb. drums lb.	.05½	.06	.05½	.06	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks lb.	.28	.29	.28	.29	28	29
Orthonitrotoluene, 1000 lb drs wk lb.	.05½	.06	.05½	.06	.14	.18
Orthonitrophenol, 350 lb dr lb.	.52	.80	.52	.90	.85	.90
Orthotoluidine, 350 lb bbl lc-l lb.	.14½	.20	.14½	.22	.20	22
Orthonitroparachlorphenol, tins lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid lb.	.07	.07¾	.06	.07¾	.06	.07½
Powdered, 100 lb bags lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P. lb.	.032	.034	.02	.034	.02¼	.03
128-132 deg. M. P. lb.	.03¼	.03¾	.03¼	.03¾	.....	.03½
133-137 deg. M. P. lb.	.043	.04½	.043	.04½	.04	.04¾
Para Aldehyde, 110-55 gal drs. lb.	.20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg. lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums lb.	.....	.....	.....	.....	.....	.....
Cymene, refd, 110 gal dr. gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks lb.	.15	.16	.15	.16	.15½	.16
Nitroacetanilid, 300 lb bbls lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks lb.	.23½	.24	.23½	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls lb.	1.25	1.30	1.15	1.30	1.15	1.20
Toluenesulfonamide, 175 lb bbls lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk lb.	.....	.58	....	.58	.42	.43
Paris Green, Arsenic Basis 100 lb kegs lb.	.....	.24	....	.24	.24	.27
250 lb kegs lb.	.....	.23	....	.23	.23	.25
Persian Berry Ext., bbls lb.	.25	Nom	.25	Nom	.25	Nom.
Pentane, normal, 28-38° C, group 3, tanks gal.	.....	.07	....	....	.....	.....
Pentasol (see Alcohol, Amyl) ...						
Pentasol Acetate (see Amyl Acetate) ...						
Petrolatum, Green, 300 lb bbl. lb.	.01⅞	.02	.01⅞	.02	.02	.02¼
Petroleum Ethers, tanks 30-60°, Group 3 gal.	.....	.10	....	.10	.....	.....
Petroleum solvents and diluents Cleaners' naphtha, Group 3, tanks gal.	.05¾	.06¼	.05	.06¾	.....	.....
Lacquer diluents, Bayonne tanks gal.	.12½	.12¾	.12	.12½	.....	.....
Group 3, tanks gal.	.07	.07¼	.06½	.08	.....	.....
Petroleum thinner 47-49 deg. tanks gal.	.04	.05¼	....	....	.....	.....
Rubber solvent, stand. grade tanks gal.	.....	.05¾	.05	.06	.....	.....
Stoddard solvents 48-50 deg. tanks gal.	.05½	.05½	.04½	.05¾	.....	.....
Phenol, 250-100 lb drums lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs lb.	.....	1.35	....	1.35	....	1.35
Phenyl Chloride, drums lb.	.....	.16	....	....	.....	.....

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Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.10	3.25
70% basis.....ton	3.75	3.90	3.75	3.90	3.75	3.90
72% basis.....ton	4.25	4.35	4.25	4.35	4.25	4.35
75-74% basis.....ton	5.25	5.50	5.25	5.50	5.25	5.50
75% basis.....ton	.....	5.75	....	5.75	.....	5.75
77-80% basis.....ton	.....	6.25	....	6.25	.....	6.25
Tennessee, 72% basis.....ton	.....	5.00	....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl.....lb.	.18	.23	.18	.23	.18	.20
Red, 110 lb cases.....lb.	.....	.45	.40	.45	.40	.46
Yellow, 110 lb cases wks.lb.	.28	.33	.27½	.33	.27½	.37½
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders.....lb.	.18	.23	.18	.23	.18	.20
Phthalic Anhydride, 100 lb bbls wks.....lb.	.15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist.....lb.	.59	.62	.59	.62	.59	.63
Prime bbls.....bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls.....gal.	.52	.54	.52	.54	.54	.61
Pitch Hardwood wks.....ton	.....	20.00	20.00	25.00	20.00	35.00
Plaster Paris, tech, 250 lb bbls .....bbl.	3.40	3.50	3.30	3.50	3.30	3.50
Platinum, Refined.....oz.	24.00	26.00	24.00	26.00	32.00	38.00
Pontol, tanks.....per gal.	.....	.54	....	.54	.54	.54
Potash, Caustic, wks, solid...lb.	.07⅛	07⅜	.06½	.07⅜	.06½	.06⅜
flake.....lb.	.0803	.08⅛	.0705	.08¼	.0705	.08
Liquid, tanks .....lb.	.....	.03½	....	....	.....	.....
Potash Salts, Rough Kainit 12.4% basis bulk.....ton	.....	9.20	....	9.20	.....	9.20
14% basis.....ton	.....	9.70	....	9.70	.....	9.70
Manure Salts						
20% basis bulk.....ton	.....	12.00	....	12.00	12.00	12.65
30% basis bulk.....ton	.....	19.15	....	19.15	.....	19.15
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags.....ton	.....	37.15	....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags.....ton	.....	27.80	....	27.80	.....	27.80
Potassium Sulfate, 90% basis bags.....ton.	....	42.15	42.15	47.50	47.50	48.25
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks.....lb.	.07¼	.08¼	.07¼	.08¼	.07	.08½
Binoxalate, 300 lb bbls.....lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs.....lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.05¾	.06½	.04⅞	.06½	.0475	.05
Chlorate crystals, powder 112 lb keg wks.....lb.	.08½	.09	.08	.09	.08	.08½
Chloride, crys bbls.....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.55	.60	.50	.60	.50	.57½
Iodide, 75 lb. bbls.....lb.	.....	2.55	2.35	2.55	.....	.....
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.13
Oxalate, bbls.....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.16	.16½	.16	.16½	.16	.16½
Prussiate, red, 112 lb keg...lb.	.....	.35	.32½	.38½	.....	.38½
Yellow, 500 lb casks.....lb.	.....	.17	.16½	.17	.16½	.21
Tartrate Neut, 100 lb keg...lb.	.....	.21	....	.21	.....	.21
Titanium Oxalate, 200 lb bbls .....lb.	.21	.23	.21	.23	.21	.23
Propane, group 3, tanks.....		.07	....	.07	.....	.....
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.04	.05
250 lb bbls.....lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	2.00	2.25	2.00	2.25	2.00	2.45
Linseed Oil, kegs.....100 lb.	3.40	3.50	3.40	3.50	3.40	4.75
Pyridine, 50 gal drums .....gal.	.85	.95	.85	.95	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	.02	.02⅜	.02	.02¼	.02	.03
450 lb bbls c-1 .....lb.	.02½	.02¾	.02⅜	.02¼	.02½	.03⅛
Solid, 63%, 100 lb bales cif..lb.	.....	.02¼	.02⅜	.02½	.02	.02½
Clarified, 64%, bales... lb.	.02⅞	.03⅛	.02⅜	.03¼	.02½	.03⅛
Quercitron, 51 deg liquid 450 lb bbls .....lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes.....lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough.....ton	.....	14.00	....	14.00	.....	14.00
Ground.....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	.....	.18	....	.18	.....	.18
Resorcinol Tech, cans.....lb.	.65	.70	.65	.70	.65	.70
Rosin Oil, 50 gal bbls, first run .....gal.	.....	....	.42	.43	.41	.45
Second run.....gal.	.40	.42	.46	.47	.45	.51
Rosin						
Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.						
B.....		4.77½	2.75	4.77½	2.95	3.65
D.....		4.92½	2.95	4.92½	3.15	3.75
E.....		5.05	3.55	5.05	3.37½	4.00
F.....		5.05	3.85	5.05	3.40	4.15
G.....		5.07½	3.90	5.07½	3.45	4.15
H.....		5.07½	4.00	5.07½	3.45	4.20
I.....		5.10	4.05	5.10	3.47½	4.25
K.....		5.12½	4.60	5.12½	3.60	4.65
M.....		5.15	4.35	5.15	4.20	5.25
N.....		5.27½	4.75	5.30	4.65	6.05

Current

Rosin
Starch, Potato

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Rosin, WG	5.30	4.80	5.60	5.25	6.45
WW	5.45	4.85	6.20	5.85	6.65
Rotten Stone, bags mines....ton	23.50 24.00	23.50	24.00	20.00	23.00
Lump, imported, bbls.....lb.	.05 .07	.05	.07	.05	.07
Selected bbls.....lb.	.09 .12	.09	.12	.09	.12
Powdered, bbls.....lb.	.02½ .05	.02	.05	.02	.05
Sago Flour, 150 lb bags.....lb.	.02½ .03	.02½	.03	.02½	.04
Sal Soda, bbls wks.....100 lb.	.90 1.00	.90	1.00	.90	1.00
Salt Cake, 94-96% c-l wks...ton	13.00 18.00	13.00	18.00	13.00	15.50
Chrome.....ton	12.00 13.00	12.00	13.00	12.00	14.50
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.05½ .06	.05½	.06½	.06	.06½
Satin, White, 500 lb bbls.....lb.	.01½	....	.01½	.....	.01½
Shellac Bone dry bbls.....lb.	.20 .22	.18	.22	.16	.26
Garnet, bags.....lb.	.14 .15	.15	.16	.15	.20
Superfine, bags.....lb.	.12½ .13½	.09½	.11½	.10	.14
T. N. bags.....lb.	.11½ .12½	.08½	.10½	.09	.13
Schaeffer's Salt kegs.....lb.	.48 .50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00 11.00	8.00	11.00	8.00	11.00
Refined, floated bags.....ton	22.00 30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	32.00	....	32.00	.....	32.00
Extra floated bags.....ton	30.00 35.00	30.00	35.00	30.00	40.00
Silver.....oz.	.34½	....	....	.....	.....
Silver Nitrate, vials.....oz.	.26½	....	....	.....	.....
Soapstone, Powdered, bags f.o.b. mines.....ton	15.00 22.00	15.00	22.00	15.00	22.00
Soda					
Soda Ash, 58% dense, bags c-l wks.....100 lb.	1.17½	....	1.17½	1.17½	.....
58% light, bags.....100 lb.	1.15 1.20	1.15	1.20	1.15	1.20
Soda Caustic, 76% grnd & flake drums.....100 lb.	2.90 3.00	2.90	3.00	2.90	3.00
76% solid drs.....100 lb.	2.50 2.55	2.50	2.55	2.50	2.55
Liquid sellers tanks, 100 bls.	2.15 2.20	2.15	2.20	.....	.....
Sodium Abietate, drs.....lb.	.03	....	.03	.....	.03
Acetate, tech 450 lb. bbls wks lb.	.04¾ .05	.04¼	.05	.04½	.05
Alignate, drs.....lb.	.50	....	.50	.....	.50
Arsenate, drums.....lb.	.07¾ .08¼	.07¾	.08¾	.....	.....
Arsenite, drums.....gal.	.50 .75	.05	.75	.50	.75
Benzoate U.S.P., kegs.....lb.	.40 .42	....	....	.....	.....
Bicarb, 400 lb bbl.....100 lb.	2.25	....	2.25	.....	2.25
Bichromate, 500 lb cks wks lb.	.04¾ .05¼	.044	.05¼	.044	.05¼
Bisulfite, 500 lb bbl wks....lb.	.02¾ .03	.02¾	.03	.03	.04
Chlorate, wks.....lb.	.05¼ .07¾	.05¼	.07¾	.05¾	.07¼
Chloride, technical.....ton	11.40 14.00	11.40	14.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.15½ .16	.15½	.16	.15½	.17
Fluoride, 300 lb bbls wks....lb.	.07 .07½	.07	.07½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.20 .21	.20	.21	.21	.24
Hypochloride solution, 100 lb. cbys.....lb.	.05	....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40 3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40 2.65	2.40	2.65	2.40	2.65
Iodide.....lb.	3.10	....	....	.....	.....
Metanilate, 150 lb bbls....lb.	.44 .45	.44	.45	.44	.45
Metasilicate, c-l, wks..100 lb.	2.85 3.25	2.85	3.25	2.85	4.00
Monohydrate, bbls.....lb.	.02½	....	.02½	.....	.02½
Naphthionate, 300 lb bbl...lb.	.52 .54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY .....100 lb.	1.31	1.26	1.31	1.185	1.73½
Nitrite, 500 lb bbls spot....lb.	.07¼ .08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25 .27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb.	.17 .19	.17	.19	.17	.20
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.20 2.40	2.00	2.40	2.00	2.75
tri-sodium, tech, 325 lb bbls.....100 lb.	2.15 2.50	2.15	2.50	2.15	3.20
Picramate, 160 lb kegs ....lb.	.69 .72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks.....lb.	.11½ .12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.15 .20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65 1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks .....100 lb.	.75	....	.75	.....	.75
Silicofluoride, 450 lb bbls NY .....lb.	.04½ .06	.04½	.06	.05½	.06½
Stannate, 100 lb drums.....lb.	.31	.18	.31½	.17	.19
Stearate, bbls.....lb.	.20 .25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16 .18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02 .02¼	.02	.02¼	.02	.02¼
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½ .02¾	.02½	.02¾	.02½	.02¾
62% solid, 650 lb drums 1c-1 wks.....lb.	.03 .03½	.03	.03½	.03	.03½
Sulfite, crystals, 400 lb bbls wks.....lb.	.03 .03½	.03	.03½	.03	.03½
Sulfocyanide, bbls .....lb.	.28 .35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.57 .67	.57	.67	.60	.88
Spermaceti, blocks, cases.....lb.	.19 .21	.17	.21	.....	.....
Cakes, cases.....lb.	.20 .22	.18	.22	.....	.....
Spruce Extract, ord., tanks..lb.	.00¾	....	.00¾	.00¾	.01
Ordinary, bbls.....lb.	.01½	....	.01½	.01½	.01¾
Super spruce ext., tanks...lb.	.01½	....	.01½	.01½	.01¾
Super spruce ext., bbls....lb.	.01¾	....	.01¾	.01¾	.01¾
Super spruce ext. powd., bags .....lb.	.04	....	.04	.04	.04½
Starch, powd, 140 lb bags .....100 lb.	2.49 2.60	2.29	2.60	2.29	2.67
Pearl, 140 lb bags.....100 lb.	2.39 2.50	2.19	2.50	2.19	2.84
Potato, 200 lb bags.....lb.	.03¾ .04	.03¾	.04	.03¾	.06
Imported bags.....lb.	.05	.04¼	.05	.04	.06¼

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Starch, Potato
Zinc Dithiofuroate

Prices

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Starch, Potato Soluble ....lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls....lb.	.07	.08½	.07	.08½	.07½	.10
Wheat, thick bags....lb.	.05¾	.06	.05¾	.06½	.06	.07
Thin bags....lb.	.09½	.10	.09½	.10	.09½	.10
Strontium carbonate, 600 lb bbls wks....lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.07¼	.07½	.07	.07½	.07	.07½
Peroxide, 100 lb drs....lb....		1.25	....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-l....100 lb....		2.05	....	2.05	.....	2.05
Crude, f. o. b. mines....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb....		2.40	....	2.40	.....	2.40
Heavy bags c-1....100 lb....		2.50	....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-1 NY....100 lb....		3.45	....	3.45	.....	3.45
Roll, bbls 1c-1 NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks....lb.	.03¼	.04¼	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl....lb.	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride....lb.	.15	.40	.15	.40	.15	.40
Sumac, ground....ton		50.00	....	....	....	....
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY....ton	48.50	50.00	48.50	50.00	40.00	50.00
Refined, white bags....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks....ton	7.50	8.00	6.50	8.00	7.00	8.00
Run of pile....ton	7.00	7.50	6.00	7.50	.....	.....
Tankage Ground NY....unit....		2.50*	1.70	2.75*	1.30	1.50
Unground....unit....		2.50	....	2.50	.....	.....
High grade f.o.b. Chicago.unit....		2.15*	1.40	2.25	1.00	1.80
South American cif....unit....		2.50	....	2.50	1.80	2.25
Tapioca Flour, high grade bgs.lb.	.03	.05	.03	.05	.03½	.05
Medium grade, bags....lb.	.03	.04	.03	.04	.03	.04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.22
25% drums....gal.	.23	.24	.23	.24	.23	.24
Tartar Emetic, Tech....gal....		.21	....	....	....	.....
U. S. P....gal....		.26	....	....	....	.....
Terra Alba Amer. No. 1, bgs or bbls mills....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.50	2.00
Imported bags....lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08	.09½
Tetralene, 50 gal drs wks....lb.	.12	.13	.12	.13	.12	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin....						
Crystals, 500 lb bbls wks...lb.	.34½	.35	.24	.36	.22	.25
Metal Straits NY....lb....		.45	.23	.43½	.211	.24½
Oxide, 300 lb bbls wks....lb.	.47	.49	.27½	.49	.23	.26½
Tetrachloride, 100 lb drs wks....lb.	.20½	.22½	.126	.22½	.1420	.1457
Titanium Dioxide 300 lb bbl...lb.	.17¼	.19½	.17¼	.19½	.17¼	.21
Calcium Pigment, bbls....lb.	.06¼	.06½	.06¼	.06½	.06¼	.07¼
Toluene, 110 gal drs....gal....		.35	....	.35	.....	.35
8000 gal tank cars wks....gal....		.30	....	.30	.....	.30
Toluidine, 350 lb bbls....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks....lb.	.27	.28	.27	.28	.27	.32
Toner Lithol, red, bbls....lb.	.80	.85	.80	.95	.90	.95
Para, red, bbls....lb....		.80	....	.80	.....	.80
Toluidine....lb....		1.35	1.35	1.55	1.50	1.55
Triacetin, 50 gal drs wks....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.10	.10½
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.38	.35	.42
Tricresyl Phosphate, drs....lb.	.19	.26	.19	.26	.21	.26
Triphenyl guanidine....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums....lb.	.37	.39	.37	.39	.50	.65
Tripoli, 500 lb bbls....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit.	10.00	11.00	10.00	11.00	10.00	11.75
Turpentine carlots, N. Y. dock bbls....gal.	.47¼	.47½	.46¼	.50	.39	.47½
Savannah, bbls....gal....		.42½	....	....	.....	.....
Jacksonville, bbls....gal....		.42½	....	....	.....	.....
Wood Steam dist, bbls....gal....		.44	.42	.46	.42	.46
Urea, pure, 112 lb cases....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f....ton....		82.60	....	82.60	.....	82.60
c. i. f. S. points....ton....		82.60	....	82.60	.....	82.60
Urea Ammonia liq. 55% NH_3, tanks....unit....		.86	....	....	.....	.....
Valonia Beard, 42%, tannin bags....ton....		34.00	27.50	34.00	28.50	34.00
Cups, 30-31% tannin....ton	22.00	.....	17.00	22.00	19.00	23.50
Mixture, bark, bags....ton....		27.00	22.00	27.00	22.00	26.00
Vermillion, English, kegs....lb.	1.29	1.36	1.05	1.40	1.28	1.80
Vinyl Chloride, 16 lb cyl....lb....		1.00	....	1.00	.....	1.00
Wattle Bark, bags....ton....		28.00	24.00	28.00	26.00	33.00
Extract 55%, double bags ex-dock....lb.	.03	.03½	.03	.03½	.03	.06½
Whiting, 200 lb bags, c-1 wks ....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY....ton....		13.00	....	13.00	.....	13.00
Gilders, bags c-1 NY...100 lb....		1.35	....	1.35	.....	1.35
Wood Flour, c-l....bags	18.00†	30.00	18.00	36.00	.....	.....
Xylene, 10 deg tanks wks...gal.	.27	.29	.27	.29	.....	.29
Commercial, tanks wks...gal....		.26	....	.26	.....	.26
Xylidine, crude....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls....lb.	.04½	.05	.04½	.05	.....	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks....lb.	.05	.05¼	.05	.05¼	.05	.06
Gran, 500 lb bbls wks....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Soln 50%, tanks wks...100 lb....		3.00	....	3.00	2.25	3.00
Cyanide, 100 lb drums....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb....		1.00	....	1.00	.....	1.00

Current

Zinc Dust
Whale Oil

		Current Market	1933 Low	1933 High	1932 Low	1932 High
Zinc Dust, 500 lb bbls c-l wks	lb.	.06¾	.07½	.04¼	.07½	.041 0525
Metal, high grade slabs c-l NY	100 lb.	4.87	3.02	4.87	2.87	3.52
Oxide, American bags wk	lb.	.05	.06	.05	.06	.0485 .07
French, 300 lb bbls wks	lb.	.05¾	.11½	.05¾	.11½	.08¼ .11
Palmitate, bbls	lb.	.18	.19	.17½	.19	....
Perborate, 100 lb drs	lb.	.....	1.25	....	1.25	..... 1.25
Peroxide, 100 lb drs	lb.	.....	1.25	....	1.25	..... 1.25
Resinate, fused, dark, bbls.	lb.	.05¾	.06½	.05¾	.06½	....
Stearate, 50 lb bbls	lb.	.16	.17	.15	.17	.16 .22
Sulfate, 400 bbl wks	lb.	.03	.03½	.03	.03½	.03 .03½
Sulfide, 500 lb bbls	lb.	.13	.13½	.12	.13½	.12 .13½
Sulfocarbolate, 100 lb keg	lb.	.21	.22	.21	.22	.21 .24
Zirconium Oxide, Nat. kegs	lb.	.02½	.03	.02½	.03	.02½ .03
Pure kegs	lb.	.45	.50	.45	.50	.45 .50
Semi-refined kegs	lb.	.08	.10	.08	.10	.08 .10

*&10 †Depends upon grade

Oils and Fats

Castor, No. 1, 400 lb bbls	lb.	.....	.09¾	.09¼	.10	.09½	.10¼
No. 3, 400 lb bbls	lb.	.08¾	.09	.08½	.09½	.08¾	.10½
Blown, 400 lb bbls	lb.	.11¼	.11¾	.11¼	.11¾	.11¼	.12½
China Wood, bbls spot NY	lb.	.07½	.07½	.04¼	.07½	.05½	.07¾
Tanks, spot NY	lb.	.07⅜	.07½	.04½	.07½	.04½	.06¼
Coast, tanks	lb.	.07	.07¼	.04½	.07¼	.04¼	.06¼
Coconut, edible, bbls NY	lb.	.....	.10¾	....	.10¾	.....	.10¾
Ceylon, 375 lb bbls NY	lb.	.04½	.04⅜	.04	.04¾	.04	.04¼
8000 gal tanks NY	lb.	.....	.03¾	.03	.03⅜	.02⅞	.03⅛
Cochin, 375 lb bbls NY	lb.	.05¼	Nom.	.04½	.05¼	.04½	.06
TanksN Y	lb.	.05	Nom.	.04	.05	.03½	.05
Manila, bbls NY	lb.	.04½	.04⅜	.04	.04¾	.04	.05
Tanks NY	lb.	.03¾	.03¾	.03¼	.03½	.03¼	.04
Tanks, Pacific Coast	lb.	.03	.03¼	.02¾	.03¼	.02¼	.03½
Cod, Newfoundland, 50 gal bbls	gal.	.25	Nom.	.19	.25	.21	.30
Copra, bags, N. Y.	lb.	.....	.017	.016	.019	.0175	.0235
Corn, crude, bbls NY	lb.	.06¾	Nom.	.05¼	.06¼	.04½	.09
Tanks, mills	lb.	.05¼	.05¼	.02¼	.05¼	.02½	.04½
Refined, 375 lb bbls NY	lb.	.07¾	Nom.	.06¼	.07¾	.05½	.07
Cottonseed, crude, mill Southeast & Valley	lb.	.04¾	.05	.02⅝	.05	.02½	.04⅛
Texas	lb.	.....	.04½	....	....	....	.....
Degras, American, 50 gal bbls NY	lb.	.....	.02¾	.02½	.03	.02½	.04
English, brown, bbls NY	lb.	.03¼	.04	.02⅛	.04	.02¼	.04
Greases, Brown	lb.	.02	.02½	.02	.02½	.01⅛	.02¾
Yellow	lb.	.03½	.03⅝	.01½	.03⅝	.01⅛	.03
White, choice bbls NY	lb.	.04¼	.04⅝	.02½	.04⅝	.02	.04¼
Herring, Coast, Tanks	gal.	.18	Nom.	.11	.18	.....	.....
Lard Oil, edible, prime	lb.	.....	.10½	.08½	.10½	.08½	.10
Extra, bbls	lb.	.....	.08½	.07½	.08¼	.05¼	.07¾
Extra No. 1, bbls	lb.	.....	.08	.06	.08	.05½	.07
Linseed, Raw, five bbl lots	lb.	.109	.111	.08	.111	.061	.078
Bbls c-l spot	lb.	.101	.103	.072	.103	.053	.07
Tanks	lb.	.095	.097	.066	.097	.047	.064
Menhaden Tanks, Baltimore	gal.	.15	Nom.	.09	.15	.09½	.20
Refined, alkali bbl	lb.	.0635	.0695	....	....	....	.....
Tanks	lb.	.....	.0595	....	....	....	.....
Light Pressed, bbls	lb.	.051	.....	.051	....	....	.....
Tanks	lb.	.....	.047	.....	....	....	.....
Neatsfoot, CT, 20° bbls NY	lb.	.....	.16½	.11¾	.16½	.11½	.13½
Extra, bbls NY	lb.	.....	.08¼	.06½	.08¼	.05¾	.07
Pure, bbls NY	lb.	.....	.14	.07¾	.14	.07¾	.09
Oleo, No. 1, bbls NY	lb.	.06⅛	.06¾	.05	.06¾	.05⅜	.07
No. 2, bbls NY	lb.	.....	.06⅛	.04¼	.06⅛	.04¾	.06
Olive, denatured, bbls NY	gal.	.66	.68	.47	.68	.51	.65
Edible, bbls NY	gal.	1.50	1.70	1.30	1.70	1.25	2.00
Foots, bbls NY	lb.	.05½	.05⅝	.04⅜	.05⅝	.04¼	.05
Palm, Kernel Casks	lb.	.04½	Nom.	.04	.04½	.035	.04¼
Lagos, 1500 lb casks	lb.	.04½	.04¼	.02⅜	.04¼	.03	.05
Niger, Casks	lb.	.03½	.03⅜	.024	.03⅜	.03	.03½
Peanut, crude, bbls NY	lb.	.07½	Nom.	.03½	.07	.02⅞	.04½
Refined, bbls NY	lb.	.08½	.11	.08½	.11	.08¼	.09
Perilla, bbls NY	lb.	.09½	.10	.05	.10	.03¾	.05¼
Tanks, Coast	lb.	.08½	Nom.	.03¾	.06½	.03¼	.05
Poppyseed, bbls NY	gal.	1.55	1.70	1.55	1.70	1.60	1.75
Rapeseed, in bond, bbls NY	gal.	.40	.43	.33	.43	.....	.....
denatured, drms, NY	gal.	.48	.50	.34	.50	.....	.....
Red, Distilled, bbls	lb.	.07	.07⅛	.05¼	.07⅛	.06½	.07
Tanks	lb.	.....	.06	.05	.06	.05¼	.06
Salmon, Coast, 8000 gal tks	gal.	.18	Nom.	.11	.18	.11	.19
Sardine, Pacific Coast tks	gal.	.20	Nom.	.09½	.20	.09½	.17½
Sesame, edible, yellow, dos	lb.	.09½	.10	.09½	.10	.08½	.09½
White, dos	lb.	.10	.11	.10	.11	.10	.11
Sod, bbls NY	gal.	.....	.40	....	.40	.....	.40
Soy Bean, crude	lb.	.....	Nom.	.032	.035	.02¾	.03½
Pacific Coast	lb.	.....	.075	.027	.075	.03	.032
Domestic tanks, f.o.b. mills,	lb.	.081	.085	.04	.085	.03¾	.05
Crude, bbls NY	lb.	.086	.095	.04½	.095	.04½	.06
Refined, bbls NY	lb.	.101	.103	....	....	.....	.....
Sperm, 38° CT, bleached, bbls NY	lb.	.094	.096	....	....	.....	.....
45°CT, bleached, bbls NY	lb.	.....	.10	.07½	.10	.07½	.09
Stearic Acid, double pressed dist bags	lb.	.09½	.10	.08	.10	.07	.08½
Double pressed saponified bags	lb.	.09½	.10	.08	.10	.07	.08½
Triple, pressed dist bags	lb.	.12¼	.12¾	.10¼	.12¾	.10½	.11
Stearine, Oleo, bbls	lb.	.....	.05	.03¾	.05	.03¾	.06
Tallow City, extra loose	lb.	.....	.03¾	.02	.03⅞	.02¼	.03¼
Edible, tierces	lb.	.....	.05¼	.03½	.05¼	.03¼	.04¼
Tallow Oil, Bbls, c-l NY	lb.	.05¾	.06	.05¾	.06	.05¾	.07½
Acidless, tanks NY	lb.	.....	.07¾	.05	.07¾	.06	.09
Vegetable. Coast mats	lb.	.04½	Nom.	.04½	Nom.	.06	Nom.
Turkey Red, single bbls	lb.	.06¼	.07½	.06¼	.07½	.06¼	.09
Double, bbls	lb.	.08	.09	.08	.09	.08	.11
Whale,							
Extra, bleached, bbls NY	lb.	.068	.07	....	....	.....	.....
Nat. winter, bbls NY	lb.	.072	.074	....	....	.....	.....

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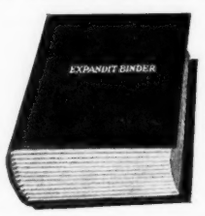

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